




Feb. 13

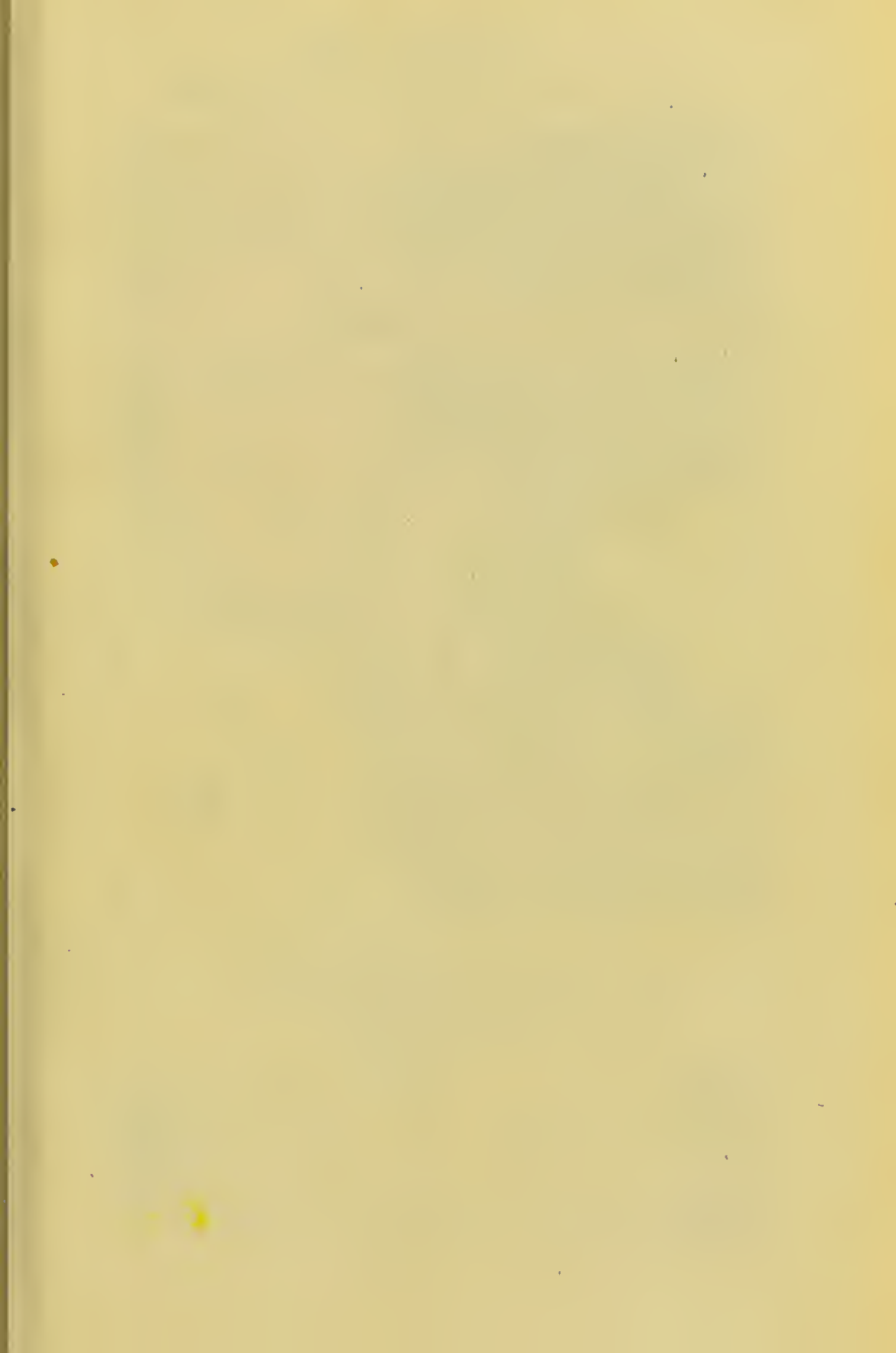
R33249



Digitized by the Internet Archive
in 2015

<https://archive.org/details/b2169946x>

THE CLIMATE
OF
THE SOUTH OF DEVON.






GEOLOGICAL MAP OF SOUTH DEVON.



T S. del.

Firolongis

The words in this character (MANGANESE) refer to mineral deposits or the habitats of other natural productions. The numerals designate the height at which the places so marked are above the level of the Sea

	BOVEY COAL		GRAUWACKE SLATES
	GREEN SANDSTONE		CARBONACEOUS SERIES
	RED SANDSTONE, NEW		CODDON HILL GRIT
	TRAP ROCKS		GRANITIC GREEN STONE
	LIMESTONE		GRANITE





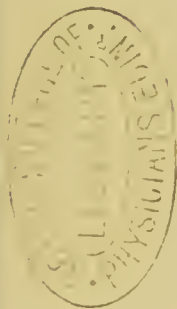
THE CLIMATE
OF
THE SOUTH OF DEVON,
AND ITS
INFLUENCE UPON HEALTH:

WITH
SHORT ACCOUNTS
OF
EXETER, TORQUAY, BABBICOMBE, TEIGNMOUTH, DAWLISH,
EXMOUTH, BUDLEIGH-SALTERTON, SIDMOUTH, &c.

BY
THOMAS SHAPTER, M.D.,

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS,
SENIOR PHYSICIAN TO THE DEVON AND EXETER HOSPITAL,
ETC., ETC., ETC.

SECOND EDITION.



LONDON:
JOHN CHURCHILL, NEW BURLINGTON STREET.

MDCCCLXII.

LONDON: BENJAMIN PARDON, PRINTER, PATERNOSTER ROW.

TO
SIR THOMAS DYKE ACLAND,
BARONET,

"TRUE TO VIRTUE, AND AS WARM AS TRUE,"

THIS BOOK

IS

Dedicated.

P R E F A C E.

TWENTY years ago the first edition of this book was published. The intervening time has permitted an extended range of observation, and the correction of some errors.

Though the general plan, with some slight alteration in arrangement, has been preserved, the whole has been more than revised ; it has been rewritten, and I trust the following pages will be found fairly to represent the general physical conditions proper to the district, and to be worthy of the approval so liberally accorded to the former edition.

The chapter on the climate has been illustrated by a series of tables, setting forth the local indications of thermometers, barometers, rain-gauges, &c. The readings of these instruments have been made from a long and continued series of observations, and then carefully reduced, so that I hope not to be deemed presumptuous in offering them to the public as a statement of the average climate of the district to which it may always be safe to refer.

At page 35 attention has been specially drawn to the indications of the "wet bulb" thermometer. I am disposed to conclude this to be a very valuable instrument, not only in its

relations to the "dry bulb," but as a substantive instrument indicating that qualified temperature which really is experienced by, and exerts an influence on, animal and vegetable existences, rather than the contemporaneous temperature indicated by the ordinary dry bulb thermometer.

It is probable that, as regards climate, all countries present their disadvantages as well as their advantages. The natural infirmity of man is too apt to induce him, instead of duly appreciating and being thankful for the latter, to enlarge upon the former. In tropical regions "heat" is the condition complained of; in northern regions "cold;" with us "rain" is the burden of complaint, and the terms "fair and foul" have chiefly reference to its deposit. The foretelling the condition of the "morrow" in this respect is considered, and justly so, an instance of great sagacity. I have now been a tolerably assiduous student of the weather for some years, and perhaps a knowledge of this kind might be expected of me. My confession, however, must be a humiliating one. Notwithstanding the attention I have paid to the subject, having reference also to the indications commonly assumed to be afforded by the moon in her ever-changing phases, and read by the arbitrary and conventional quarterings of the almanacs, nor forgetting the dogmatic statements of the so-called "Herschel's Table," I am as unable as my neighbours to predict, from any scientific data, what may be the precise state of the weather on any given day. In fact I am not weatherwise. I can offer nothing but the results to be learned from the experience of times gone by, and the averages deduced therefrom: "That which hath been is now; and that which is to be hath already been; and God requireth that which is past."

The several chapters on the natural productions, the civil and economical history, and the vital statistics of the district, must be taken for what they are intended—mere sketches illustrative of the main object of the book. They do not, in

any way, profess to be minute, or to exhaust the subjects to which they are apportioned. In the map which faces the title-page I ventured in the former edition, contrary to the statement of Sir H. De la Beehe, and the authority of the map of the Ordnance Survey, to omit the green sand on the Woodbury Hills. To this I still adhere, and am supported in so doing by the opinions of William Viekary, Esq., and Mr. Parfit.

In the former edition, when treating of the diseases of the district, many of the conclusions were stated from tables deduced from the returns of the Exeter Dispensary. These are now entirely discarded. Statistics, unless they be full and comprehensive, are worse than useless; they misguide by enunciating, with the precision of truth, that which is incorrect. Statistics of disease, to be of any service, must take in the casualties that befall the whole of the population of the district then under consideration. The references made to this subject have therefore been exclusively drawn from the returns of the Registrar-General. These, as fulfilling this condition, are in the main trustworthy and most valuable. The details of the diseases, their symptoms, treatment, &c., are entirely supplied from the personal experience of many years, and, as such, they may have their interest.

There remains for me a pleasing duty. In the prosecution of the various chapters of this book the liberal assistance of many friends has been afforded me, and to them my best thanks are due. I must, however, particularly mention Henry Storks Eaton, Esq., who, besides various suggestions connected with the subject of climate, reduced the barometrical observations to a uniform standard—a work of much labour. He also contributed the very interesting storm chart of the 25th and 26th October, 1859.

To Mr. Parfit, the learned Librarian of the Devon and

Exeter Institution, I am indebted for many valuable suggestions relative to the geological structure of the district. The chapter on this subject, which previously had the advantage of the efficient supervision of Joseph Parker, Esq., has thus been rendered more complete and consistent with the conclusions of recent observations.

Before concluding, it will gratify me to refer to one other subject. The former edition of this work was, by permission, dedicated to Sir Thomas Dyke Acland. This edition he has permitted also to be dedicated to him. May I not esteem it an honour to receive, so far, the kind countenance of one to whom, in appreciation of his high qualities, a public monument has been erected?

“Presenti tibi maturos largimur honores.”

THE BARNFIELD, EXETER,
27th August, 1862.

CONTENTS.

	PAGE
PREFACE	vii—x

CHAPTER I.

CLIMATE OF THE SOUTH OF DEVON	1—60
---	------

General Position of South Devon, 1; Physiognomy of the District, 2; Longitude and Latitude, 3; Calculated Temperature (*note*), 3; Table of Mean Annual Temperature for Thirty Years, 4; Mean Monthly Temperature, 5; Table of, 5; Temperature of every Month for Thirty Years, table of, 6 and 7; Temperature of the Seasons, 8; Diurnal Variations in Temperature, 8; Temperature in the Sun, 11; Range of Temperature, 13; Table of, 14; Rivers Frozen, 14; Extremes of Temperature, 16; Wind, 16; Tables of, 17; Storms, 20; Chart of Storm, 22; Barometer, table of, 23; Highest and Lowest Barometer in forty years, 24; Diagram of Barometric Curves, 27; Range of Barometer, 28; Dew-point, 31; Table of, 32; Wet Bulb Thermometer, 35; Table of, 34; Cloud, 36; Table of, 36; Mists and Fogs, 38; Rain, 39; Annual Average Amount of, 40; Various Tables of Rain, 39—49; Rain in different Months, 42; Drizzle, 45; Snow, 50; Hail, 52; Thunder and Lightning, 52; Ozone, 54; Summary of Climate, 54; Climate compared with other places, 57; Comparison with Climate of London, 58.

CHAPTER II.

	PAGE
GEOLOGY AND HYDROLOGY OF SOUTH DEVON	61—98
Granite, 61 ; Trap Rocks, 65 ; Greenstone, 65 ; Claystone, 66 ; Grauwacke, or the Devonian Series, 70 ; Slates, 72 ; Limestones, 72 ; Bone Caverns, 73 ; Carbonaceous Rocks, 75 ; Slates, 76 ; Limestone, 76 ; Vegetable Impressions, 79 ; New red Sandstone, 80 ; Exeter Conglomerate, 80 ; Heavitree Quarry, 83 ; Green Sand, 88 ; Chalk, 89 ; Bovey Coal, or Lignite, 90 ; Gravels, 93 ; Valleys, 94 ; Boundaries of South Devon (<i>note</i>), 94 ; Hydrology, 94 ; Watershed, 94 ; Waters of the Granite, 95 ; of the Trap, 95 ; of the Devonian and Carbonaceous Series, 96.	

CHAPTER III.

PRINCIPAL INLAND AND SEA-COAST TOWNS OF SOUTH DEVON	99—129
Exeter, 99 ; River Floods, 102 ; Levels of Country, 105 ; St. Thomas, 108 ; Heavitree and St. Leonard, 108 ; Ide, 108 ; Topsham, 109 ; Lympstone, 109 ; Starcross, 109 ; Upton and West Hill, 110 ; Moreton, Lustleigh, South Bovey, and Chudleigh, 111 ; Woodbury, 112 ; Salcombe, 112 ; Dartmouth, 113 ; Brixham, 113 ; Paignton and Goodrington, 114 ; Torquay, 114 ; Babbicombe, 117 ; Teignmouth, 118 ; Dawlish, 121 ; Exmouth, 122 ; Budleigh-Salterton, 125 ; Sidmouth, 127 ; Branscombe, 128 ; Beer, 129 ; Seaton, 129.	

CHAPTER IV.

NATURAL PRODUCTIONS OF THE SOUTH OF DEVON	130—142
Mammalia, 130 ; Devon Cow and Steer, 130 ; Sheep, 131 ; Pig, 131 ; Ponies and Pack-Horses, 132 ; Wild Mammals, 132 ; Octacea, 132 ; Ornithology, 133 ; Migratory Birds, 134 ; Amphibia, 135 ; Ichthyology, 135 ; Edible Fish, 136 ; Botany, 137 ; Horticulture, 138 ; Apples, 139 ; Pears, 140 ; Plants, Acclimatized, List of, 141.	

CHAPTER V.

CIVIL AND ECONOMICAL HISTORY OF SOUTH DEVON	143—156
Occupations, 143 ; Woollen Manufacture, 143 ; Lace Manufacture, 144 ; Potteries, 144 ; Whetstones, 145 ; Houses, 146 ; Fuel, 146 ; Roads, 147 ; Canals, Exeter, 148 ; Stover, 149 ; Tiverton and Western, 149 ; Railroads, 149 ; Water supply, 149 ; Exeter Waterworks, 149 ; Torquay and Newton-Abbot Water-works, 151 ; Diet, 151 ; Cider, 151 ; Cream, 154 ; Laver, 155 ; Amusements, 155.	

CHAPTER VI.

	PAGE
VITAL STATISTICS OF THE SOUTH OF DEVON.	157—167
Area, 157; Population, 156; Increase of, 159; Proportion of Sexes, 162; Marriages, 162; Births, 165; Deaths, 166.	

CHAPTER VII.

DISEASES OF SOUTH DEVON	168—262
-----------------------------------	---------

Epidemics, Historical Enumeration of (*note*), 168; Epidemics, Recent, 170; Type of Disease, 173; Influence of Season, 174; Table of Diseases and Deaths, 176; Small-pox, 176; Vaccination, 179; Swine-pox and Chicken-pox, 180; Measles, 181; Scarlet Fever, 183; Angina Maligna, 187; Diphtheria and Croup, 188; Whooping Cough, 188; Fever, 189; Relapsing Fever, 192; Erysipelas, 197; Metria, 198; Furunculus, 199; Influenza, 199; Dysentery, 204; Diarrhoea, 205; Asiatic Cholera, 206; Remittent Fever, 208; Intermittent Fever, 208; Rheumatism, 209; Leprosy, 211; Hydrophobia, 212; Necrosis, 213; Scurvy, 213; Purpura, 215; Bronchocele, 216; Alcoholism, 217; Parasitici, 218; Gout, 219; Dropsy, 220; Scirrhus, 221; Melanosis, 222; Lupus, 222; Cancerum Oris, 222; Mortification, 223; Bed Sores, 223; Scrofula, 224; Consumption, 224; Affections of Brain and Nerves, 226; Apoplexy, 228; Paralysis, 229; Chorea, 229; Delirium Tremens, 230; Insanity, 231; Puerperal Mania, 234; Fright, 235; Epilepsy, 236; Catalepsy, 237; Hysteria, 237; Spinal Irritation, 238; Tetanus and Trismus, 240; Laryngismus Stridulus, 241; Neuralgia, 241; Diseases of Heart and great vessels, 241; Hæmorrhage, 242; Laryngitis, 243; Diseases of the Respiratory Organs, 243; Pleurisy, 244; Empyema, 244; Pneumonia, 245; Peripneumonia Notha, 245; Catarrhal Peripneumonia, 246; Asthma, 246; Diseases of the Digestive Organs, 247; Glossitis, 247; Stomatitis, 247; Oesophagitis, 248; Stricture of Oesophagus, 248; Diseases of Stomach, 248; Gastritis, 249; Peritonitis, 249; Enteritis, 250; Lead Colic, 250; Dyspepsia, 251; Diseases of Pancreas, 252; Hæmatemesis, 253; Melaena, 253; Splenitis, 254; Diseases of Liver, 255; Jaundice, 255; Gall Stones, 256; Diseases of Urinary Organs, 257; Nephritis, 257; Diabetes, 258; Calculus of Bladder, 259; Hæmaturia, 259; Inflamed Prostate, 260; Irritable Bladder, 260; Uterine Diseases, 261; Ovarian Disease, 261; Chronic Eruptions, 261.

CHAPTER VIII.

PAGE

THE CLIMATE OF THE SOUTH OF DEVON CONSIDERED WITH REFERENCE TO ITS GENERAL EFFECTS IN HEALTH AND DISEASE . . .	263—279
---	---------

General Effects in Health and Disease, 263 ; Changes of Climate considered, 264 ; Effects in Climatic Diseases, 265 ; in Scrofula, 267 ; Scrofula described, 268 ; Consumption, 273 ; Three stages considered in reference to Climate, 273 ; Bronchitic Affections, 276 ; Effects of Climate in, 276 ; Asthma, 277 ; Dyspepsia, 277 ; Gout, 278 ; Female Diseases, 279.

PLATES.

GEOLOGICAL MAP OF SOUTH DEVON	To face Title-page
CHART OF STORM, 25TH AND 26TH OCTOBER, 1859	p. 22
BOUNDARIES AND WATERSHED OF SOUTH DEVON	p. 99

CLIMATE OF SOUTH DEVON.

CHAPTER I.

DEVONSHIRE, from the characteristics of its climate, has long been one of the favourite resorts of the invalid. It is, therefore, not surprising that Sir James Clark, in his work on Climate,* should have stated it to be extraordinary, "notwithstanding the public attention has been so long directed towards the climate of Devonshire, how few are the materials which can be collected with reference to this subject." It is hoped the following pages will show this deficiency of materials now no longer exists; and that, as regards the South of Devon, observations so large and comprehensive have been made as to enable the characteristics and peculiarities of its climate to be fairly deduced and set forth.

In general terms, the South of Devon has a climate which may be stated to be mild, equable, and moist. These characteristics, though chiefly due to latitude, are greatly influenced by position, as regards the surrounding ocean, forming, as it does, a portion of a large promontory or imperfect peninsula, projecting westward into the Atlantic, and whose southern face is entirely sea coast. To this latter circumstance, without reference to others, belong conditions which not only ameliorate a climate, and soften its general character, but likewise tend to produce an equability of temperature, which is not common to larger breadths of land.

* Clark on Climate, p. 138; 1841.

The circumstances which exert an influence on, and may be said to determine, the climate of a district, are by some meteorologists very much restricted; and Leslie, whom we must regard as a great authority, affirms they are reducible to two—distance from the equator, and height above the level of the sea. There can be no doubt, however, that the operation of the relative masses of land and water, of the geological character and cultivation of the soil, of the aspect of the sloping side, and more especially of the prevalence of the different winds, must be taken into account; for, most assuredly, each of these tends, in some respects, not only to modify a local climate, but to constitute circumstances materially influencing the personal feelings and well-being of the individual that may exist in it.

In order fully to appreciate how far the peculiar characteristics of the climate of South Devon may be determined by these various causes, it is proposed, in the following pages, to consider generally the physical conditions of that southern portion of the country, which includes Exeter and its neighbouring towns, with the several well-known contiguous watering places. It would be inconvenient, as well as unnecessary, to limit these observations by any very arbitrary or artificial boundary; moreover, the subject will be more usefully entertained by referring to those places, with their attendant circumstances, as are of prominent interest in their relations to health, or as residences for the invalid.

The general physiognomy of the portion of the country now to be considered, may be stated as being that of a succession of undulating high grounds, with luxuriant vales and small fertile valleys, for the most part in a state of high cultivation, and densely-wooded by very lofty hedge-rows; these, which are thickly studded with elm and oak trees* (the former especially

* The demarcation of the oak and elm countries is very striking. The rich red sandstone district of the vale of the Exe is luxuriant with elms; the cold shillet or silurian slate has oak for its weed. This is strikingly exemplified on the road between Crediton and Copplestone: the observant traveller by the North Devon Railway cannot fail to notice it.

in the vale of the Exe), form boundaries of, generally speaking, somewhat small enclosures. Besides the undulating high grounds, there are hills and ridges of very considerable altitude, as those of Dartmoor, Haldon, Woodbury, Whitestone, &c.

Though it is not the purpose of these pages to dwell upon the scenery of the district, it may not be inapposite to mention, that at almost every step those varying scenes of rich home views and extended prospects present themselves, which have greatly contributed to obtain for Devonshire the name of one of the most beautiful counties in England.

We shall now proceed to consider, in detail, the climate of the South of Devon. In order to do this, the results of a long series of observations made at Exeter will be set forth simply, and without reference to any theories. These observations may then be compared with those made at such other principal places within the district, as will further illustrate the subject. Before doing this, it should be stated that the latitude of Exeter is $50^{\circ} 45' N.$, and its longitude, $3^{\circ} 41' W.$

TEMPERATURE.—The annual temperature, deduced from the arithmetical mean of daily observations, made during thirty consecutive years (*i.e.* from 1824 to 1853 inclusive), is $50^{\circ} \cdot 7$; * and this observed mean temperature so nearly accords with that calculated as proper to the latitude of this district, that they may be considered as identical.*

* According to the formula of Leslie, the mean temperature of this district at the level of the sea is 53° , with an almost extreme variation of 90° : the line of perpetual snow being 6167 feet above the level of the sea. So that its observed mean temperature of $50^{\circ} \cdot 7$ is $5^{\circ} \cdot 5$ below the mean of the whole earth, and $1^{\circ} \cdot 9$ below the estimated climate for Exeter, which is $52^{\circ} \cdot 6$, as a deduction for altitude must be made of about one degree for every 100 yards.

According to the formula of Brewster, the temperature should be $51^{\circ} \cdot 5$; this very nearly approximates to the observed climate, especially if the necessary reduction in this latter be made for elevation.

In the table of Ptolemy, which is generally esteemed to be very accurate, this district is in the eighteenth climate or parallel, with $16^h 15'$ for the length of its midsummer day, and $1^{\circ} 36'$ for the breadth of its zone. Humboldt, however, laying aside every theoretical consideration, has endeavoured to arrange

On reviewing the mean temperature of each of these thirty years, no very striking differences are to be observed ; the mean

TABLE 1.—*The mean, the mean maximum, the mean minimum, and the mean range of temperature, for thirty consecutive years ; together with the extreme maximum and the extreme minimum, with the range for this period.*

YEAR.	THERMOMETER.						
	Mean.	Mean Max.	Mean Minim.	Difference of the two preceding columns.	Extreme Max.	Extreme Minim.	Range.
1824.....	51.2	56.0	46.5	9.5	79	26	53
1825.....	52.9	58.3	47.6	10.7	94	25	69
1826.....	53.5	60.1	46.8	13.3	85	21	64
1827.....	51.6	57.7	45.5	12.2	81	22	59
1828.....	52.3	57.5	47.3	10.2	82	27	55
1829.....	48.6	54.6	42.6	12.0	76	14	62
1830.....	49.6	56.2	43.1	13.1	84	16	68
1831.....	51.7	58.5	45.0	13.5	82	22	60
1832.....	50.5	56.9	44.0	12.9	80	27	53
1833.....	49.8	56.5	43.2	13.3	80	25	55
1834.....	51.4	57.4	45.5	11.9	81	28	53
1835.....	50.6	57.2	44.1	13.1	86	17	69
1836.....	49.7	55.5	43.0	12.5	80	23	57
1837.....	49.6	55.6	43.7	11.9	82	20	62
1838.....	49.3	55.7	42.9	12.8	77	17	60
1839.....	50.0	56.8	43.5	13.3	78	23	55
1840.....	50.1	56.9	43.3	13.6	79	18	61
1841.....	50.3	56.7	43.6	13.1	82	13	69
1842.....	51.2	58.0	44.5	13.5	82	23	59
1843.....	51.1	56.8	45.4	11.4	81	23	58
1844.....	50.0	57.0	43.0	14.0	79	23	56
1845.....	49.2	56.2	42.1	14.1	81	15	66
1846.....	52.0	59.1	45.0	14.1	84	23	61
1847.....	50.8	57.7	43.8	13.9	83	18	65
1848.....	50.4	57.5	43.3	14.2	79	21	58
1849.....	50.8	58.4	43.1	15.3	77	21	56
1850.....	50.1	57.5	42.7	14.8	82	21	61
1851.....	50.2	57.9	42.6	15.3	80	24	56
1852.....	50.7	58.5	42.8	15.7	84	25	59
1853.....	49.1	56.3	41.9	14.4	78	19	59
Mean for 30 years.....	50.7	57.1	44.0	13.1	81.2	21.3	59.9

the places on the earth's surface under what he terms isothermal lines ; these lines being determined by the mean temperature of the places themselves. According to this system, he fixes this portion of Devon, erroneously certainly, on the northern side of that line, the like temperature of which is stated to be 50°, and within that zone, whose annual mean ranges from 41° to 50°, the extreme range during the year being estimated at 32°.5. This system is here particularly mentioned, as it will greatly facilitate comparison with such districts as may be deemed desirable.

variation in succeeding years being less than one degree ($0^{\circ}9$), while the greatest between any two successive years (1828 and 1829) amounts to less than four degrees ($3^{\circ}7$); and that between the year of the highest (1826) and the year of the lowest (1829) mean temperatures of the whole series of thirty years, is only five degrees ($4^{\circ}9$).

This small amount of variation in the mean annual temperature would appear scarcely to permit the grouping of the years into a series of hot and cold years; nevertheless, the first five years (1824-28) present a mean temperature above the average, followed by two (1829-30) below. There was then another year (1831) in which the mean temperature was above the average, from which time, with one exception (1846), the tendency of the mean temperature has been to be rather below the average.

Though the average mean temperature of these thirty years is thus uniformly similar, any conclusions as to a general equability of climate cannot be assumed therefrom, or only with considerable modifications. Seasons of excessive heat may be followed by those of extreme cold,—hence, though a mean temperature

TABLE 2.—*The mean, the mean maximum, and mean minimum, with the absolute maximum and minimum temperature, during each month for thirty successive years.*

	Mean Max.	Mean Min.	Mean.	Difference between columns 1 and 2.	Absolute Max.	Absolute Min.
January ...	44 ⁵	35 ¹	39 ⁸	9 ⁴	57 ⁰	13 ³
February...	46 ³	36 ²	41 ³	10 ¹	58	16
March ...	49 ⁴	37 ²	43 ³	12 ²	63	15
April ...	55 ³	40 ⁵	47 ⁹	14 ⁸	74	27
May ...	62 ⁵	46 ²	54 ⁵	16 ³	82	31
June ...	67 ⁹	51 ⁸	59 ⁸	16 ¹	84	41
July ...	70 ⁷	54 ⁵	62 ⁶	16 ²	94	40
August ...	69 ⁷	53 ⁹	61 ⁸	15 ⁸	85	41
September ...	64 ⁶	50 ²	57 ⁴	14 ⁴	79	34
October ...	57 ⁶	45 ⁴	51 ⁵	12 ²	69	24
November ...	50 ⁹	40 ³	45 ⁷	10 ⁶	66	24
December ...	46 ⁷	37 ⁶	42 ²	9 ¹	59	16
Means & Extremes	57 ¹	44	50 ⁷	13 ¹	94	13

approaching to the average may be the calculated result, there really has been a condition of temperature far removed from uniformity or equability. In order to arrive at a correct appreciation of the equability of the climate, the temperature of succeeding seasons, months, or even days, must be looked to.

January, the mean temperature of which is $39^{\circ}8$, is, on the average, the coldest month of the year. From this month the temperature progressively increases until July, when the mean monthly maximum of $62^{\circ}6$ is attained. During this period there has been, therefore, a mean increase of temperature of $22^{\circ}8$. The temperature then gradually decreases to the same amount through the remaining months, until the minimum of January is again established.

The mean monthly variations of temperature, whereby these changes are established, amount to nearly four degrees ($3^{\circ}8$). Nevertheless, it will be seen, on looking carefully at the mean temperature of each month (*vide* Tables 2 and 3), that considerable,

TABLE 3.—Mean maximum, mean minimum, and mean temperature

	JANUARY.			FEBRUARY.			MARCH.			APRIL.			MAY.			JUNE.			JULY.		
	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean
44	47	37	40	47	39	43	47	38	42	51	41	46	59	47	53	64	52	58	70	56	63
45	48	37	42	46	38	42	47	41	44	57	44	51	61	49	55	66	53	59	76	56	65
46	49	31	36	51	41	46	50	40	45	59	48	52	60	46	53	79	55	67	72	57	67
47	43	35	39	40	31	35	51	41	46	58	43	51	61	47	54	65	52	58	72	55	63
48	44	39	42	49	38	43	58	40	46	54	43	49	59	50	55	68	54	61	66	54	61
49	38	29	33	47	37	42	46	35	41	52	39	46	66	48	57	66	52	59	68	51	61
50	37	28	32	43	33	38	42	31	39	49	40	49	62	46	54	64	50	57	71	54	62
51	41	33	37	47	37	42	45	39	44	56	43	49	62	47	55	64	51	58	72	53	63
52	41	33	37	47	37	42	45	39	44	56	43	49	62	47	55	64	51	58	72	53	63
53	40	32	36	48	38	43	43	32	38	53	44	50	65	45	53	65	50	57	70	54	62
54	41	34	39	45	34	39	43	35	40	54	45	51	66	46	54	66	51	58	70	54	62
55	44	37	40	48	39	43	46	38	43	57	48	54	67	49	57	69	54	61	73	57	65
56	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
57	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
58	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
59	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
60	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
61	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
62	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
63	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
64	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
65	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
66	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
67	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
68	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
69	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
70	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
71	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
72	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
73	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
74	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
75	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
76	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
77	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
78	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
79	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
80	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
81	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
82	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
83	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
84	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
85	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
86	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
87	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
88	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
89	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
90	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
91	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
92	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
93	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
94	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
95	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
96	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
97	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
98	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
99	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70
100	48	40	44	52	43	47	50	41	46	60	51	57	70	53	61	73	58	66	75	62	70

and, as regards the climate, important variations from this average occur. During January, February, and March, the temperature remains tolerably uniform. A progressive increase of some considerable amount then takes place, that is, through the months of April, May, and June. But the greatest relative amount is between April and May, when there is a mean increase of more than six degrees and a half ($6^{\circ}6$). During July and August, the temperature again remains somewhat stationary; after which, the successive decrements of September, October, and November, prepare for the cold of the succeeding three months.

The temperature of the four consecutive months—December, January, February, and March, are characterized by tolerable evenness, as are also the months of July, August, and September; whilst those of April, May, and June, and of October and November, are the periods of fluctuations, and during which are established those changes which constitute the differences between the summer and the winter temperature.

every month for thirty years, from 1824 to 1853.

AUGUST.			SEPTEMBER.			OCTOBER.			NOVEMBER.			DECEMBER.			TOTAL MEANS		
Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean
68.0	55.9	61.9	65.0	54.0	59.5	55.1	48.8	51.9	52.4	45.3	48.8	48.1	41.0	44.5	56.0	46.5	51.2
71.4	57.7	64.5	69.4	60.9	65.0	58.7	50.9	54.8	50.2	41.6	45.9	47.2	39.6	43.4	58.3	47.6	52.9
73.8	57.6	65.7	69.6	53.1	61.3	64.3	50.9	57.6	48.0	39.2	43.6	49.4	42.5	45.9	60.1	46.8	53.5
69.2	51.3	61.7	65.7	52.5	59.2	57.6	48.4	53.0	51.0	43.1	48.5	53.2	41.3	47.2	57.7	45.5	51.6
68.4	51.0	61.2	64.0	56.4	60.2	58.1	47.6	52.8	52.9	44.2	48.5	50.5	43.2	46.8	57.5	47.3	52.3
66.9	53.0	59.9	61.8	47.0	54.4	55.7	41.9	50.3	46.3	36.5	41.4	40.0	31.8	35.9	54.6	42.6	48.6
60.2	51.6	60.4	62.5	47.6	55.0	59.7	46.7	53.2	53.1	40.3	46.7	42.0	33.5	37.7	56.2	43.1	49.6
1 73.3	56.4	64.8	64.8	47.3	56.0	61.0	50.5	55.7	51.7	40.5	46.1	48.8	39.6	41.2	58.5	45.0	51.7
2 69.4	55.1	62.2	64.3	49.4	56.8	57.6	44.3	50.9	50.2	40.4	45.3	48.0	38.8	43.4	56.9	44.0	50.5
3 68.0	51.6	59.8	61.4	48.5	54.9	58.2	45.2	51.7	51.4	41.4	46.4	51.8	41.3	46.0	56.5	43.2	49.8
4 68.8	55.3	62.0	61.4	52.0	56.7	58.1	46.5	52.3	48.0	40.0	44.0	40.5	38.7	42.6	57.4	45.5	51.4
5 72.8	55.3	64.1	65.1	50.2	57.6	55.3	43.6	49.4	49.5	41.9	45.7	41.8	32.8	37.1	55.5	43.0	49.7
6 69.9	53.9	61.9	61.4	48.7	55.0	54.5	42.3	48.4	48.7	39.1	43.9	42.1	36.1	39.3	57.2	44.1	50.6
7 68.8	55.6	62.2	63.1	50.9	57.0	58.7	47.6	50.1	49.8	39.2	44.5	46.3	39.3	42.8	55.6	43.7	49.4
8 70.2	55.6	62.0	64.6	48.8	56.7	58.6	46.4	52.5	48.5	38.6	43.5	47.0	37.5	42.2	55.7	42.9	48.3
9 68.5	52.7	60.6	63.3	49.8	56.5	56.5	44.7	50.6	51.3	39.8	45.5	46.6	37.2	41.9	56.8	43.5	50.9
0 72.8	55.0	63.9	63.1	47.3	55.2	56.3	42.3	49.3	51.3	40.4	45.8	39.9	32.3	36.1	56.9	43.6	50.1
1 67.6	54.8	61.2	65.5	52.0	58.7	56.1	44.8	50.4	50.6	38.6	44.6	47.7	37.0	42.8	56.7	43.8	50.3
2 73.0	57.2	65.1	64.6	51.9	58.2	54.2	40.3	47.3	50.3	40.5	45.4	51.9	44.0	47.9	58.0	44.5	51.2
3 70.1	55.1	62.6	69.6	51.2	61.9	56.2	45.4	50.8	50.2	40.6	45.4	49.2	43.1	46.2	56.8	45.4	51.1
4 65.8	50.1	57.9	65.9	50.5	58.2	58.1	43.6	50.8	51.8	40.7	46.2	39.9	32.3	36.1	57.0	43.0	50.0
5 65.9	49.3	57.6	62.9	47.0	54.9	57.8	41.7	51.2	52.6	41.4	47.0	49.3	37.0	43.1	56.2	42.1	49.2
6 71.5	56.1	63.8	68.1	51.7	59.9	57.8	44.3	51.0	52.5	41.3	46.9	41.5	31.2	30.3	59.1	45.0	52.9
7 70.2	53.1	61.6	61.1	47.8	55.9	59.0	47.9	53.5	54.0	42.0	48.0	48.6	38.1	43.4	57.7	43.8	50.3
8 67.4	51.5	59.4	64.3	48.4	56.3	57.8	43.8	50.8	50.1	38.5	44.3	48.5	37.6	43.0	57.5	43.3	50.4
9 69.7	52.6	61.1	65.4	49.0	57.2	59.5	45.5	52.2	52.2	41.2	46.7	46.9	34.2	41.9	58.4	43.1	50.8
0 69.9	50.8	60.3	61.6	47.7	56.1	54.5	40.6	47.5	54.1	41.4	47.7	48.2	37.9	43.0	57.5	42.7	50.1
1 70.8	53.3	62.0	61.4	45.7	55.0	59.9	45.3	52.6	46.1	33.0	39.5	46.0	36.3	41.2	57.9	42.6	50.2
2 70.8	52.2	61.5	61.6	47.6	56.1	55.6	40.5	48.0	54.5	41.6	48.1	52.7	41.3	47.0	58.5	42.8	50.7
3 69.6	51.6	60.6	64.4	47.6	56.0	57.8	45.3	51.5	50.1	38.4	44.3	41.3	31.6	36.4	56.3	41.9	49.1
4 69.7	53.9	61.8	64.6	50.2	57.4	57.6	45.4	51.5	50.9	40.3	45.7	46.7	39.6	42.2	57.1	44.0	50.7

By massing together the temperature of the different seasons,* the comparative evenness of the winter and summer temperature, with the fluctuations in the spring and autumn, is rendered more obvious. The mean temperature of the seasons is severally—for the winter, forty-one degrees ($41^{\circ}4$); spring, fifty-four ($54^{\circ}1$); summer, sixty and a half ($60^{\circ}6$); and autumn, forty-six and a half ($46^{\circ}6$): showing that the great variations in temperature take place during the spring and autumn, the mean variation at these seasons being more than double what it is between winter and autumn, or between the summer and the spring.

The diurnal variations in temperature, and which comprise the differences between the day and the night, are a very impor-

TABLE 4. — *Mean variation in temperature during each succeeding month.*

Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean.
$-2^{\circ}4$	$+1^{\circ}5$	$+2^{\circ}0$	$+4^{\circ}6$	$+6^{\circ}6$	$+5^{\circ}3$	$+2^{\circ}8$	$-0^{\circ}8$	$-4^{\circ}4$	$-5^{\circ}9$	$-5^{\circ}8$	$-3^{\circ}5$	$-3^{\circ}8$

TABLE 5. — *The mean, the mean maximum and minimum, with the absolute maximum and minimum temperature, during each of the four quarters of the year, for thirty successive years.*

	Mean Max.	Mean Min.	Mean.	Difference.	Absolute Max.	Absolute Min.
Winter	$46^{\circ}7$	$36^{\circ}1$	$41^{\circ}4$	$10^{\circ}6$	58	13
Spring	$61^{\circ}9$	$46^{\circ}1$	$54^{\circ}1$	$15^{\circ}8$	84	27
Summer	$68^{\circ}3$	$52^{\circ}8$	$60^{\circ}6$	$15^{\circ}5$	94	34
Autumn	$51^{\circ}7$	$41^{\circ}1$	$46^{\circ}4$	$10^{\circ}6$	69	16

* To do this accurately, the winter season ought to include (*vide* Luke Howard's Lectures on Meteorology, p. 49) the fifteen days before the winter solstice, and from thence eighty-nine days (or in leap year ninety), beginning on the 7th of December, and for the summer season fifteen days before the autumnal equinox, or ninety-three days from the 7th of June. The intermediate seasons of spring and autumn consist, the one of ninety-three days, from the 6th of March, the other of ninety days, from the 8th of September. The general practice, however, is to divide the year into tri-monthly quarters, ending severally—the winter on the 31st of March, the spring on the 30th of June, the summer on the 30th of September, and the autumn on the 31st of December. This division of the year has now been adopted by the Registrar General for the general statistical purposes of the country; and throughout these pages, when speaking of the four quarters of the year, this arrangement will be followed.

tant element in determining climate. For this district, the mean maximum daily temperature in the shade is fifty-seven degrees ($57\cdot1$); the minimum is nearly forty-four degrees ($43\cdot9$); so that the mean variation in temperature amounts to thirteen degrees ($13\cdot2$), and this represents the mean difference of temperature between the warmest period of the day and the coldest period of the night.

This relative mean difference of temperature is, however, greatly modified during the several seasons of the year. As a general law, it may be stated that the warmer the weather the greater is the difference between the highest and lowest temperatures of the twenty-four hours; the average difference of nine degrees ($9\cdot1$) in December (*vide* Table 2, page 5), gradually increasing till the extreme mean of sixteen degrees ($16\cdot2$) is attained in July; when it again gradually diminishes to the minimum of December. If the average maximum and minimum diurnal temperature during each month of the year, be compared together, it will be seen that the temperature of the night is more uniform than that of the day (*vide* Table 6); and this would appear to depend upon the direct rays of the sun, so affecting the air by day, as disproportionately to raise its temperature over that of the night. The consequence of this is, that the daily maximum temperature presents a mean monthly excess of variation over that of the minimum of more than one degree; the mean variation in successive months being, in the maximum temperature, nearly four degrees and a half ($4\cdot4$), and in the minimum, rather more than three degrees ($3\cdot2$).

During the winter quarter (*vide* Table 7), the relative variation

TABLE 6.—Mean variation in the maximum and minimum temperature, in successive months.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean.
Max.	- $2\cdot2$	+ $1\cdot7$	+ $3\cdot2$	+ $5\cdot9$	+ $7\cdot2$	+ $5\cdot4$	+ $2\cdot8$	- $1\cdot0$	- $5\cdot1$	- $7\cdot0$	- $6\cdot7$	- $4\cdot2$	- $4\cdot4$
Min.	- $2\cdot5$	+ $1\cdot1$	+ $1\cdot0$	+ $3\cdot3$	+ $5\cdot7$	+ $5\cdot6$	+ $2\cdot5$	- $8\cdot4$	- $3\cdot7$	- $4\cdot8$	+ $5\cdot1$	- $2\cdot7$	- $3\cdot2$

in the day and night remains nearly the same, there being about a mean fall of five degrees from the preceding quarter during each of these periods of the twenty-four hours. There is, however, towards the end of the quarter, an impress of the sun's power during the day-time; for in March (*vide* Table 6, p. 9) the day temperature rises three degrees ($3^{\circ}\cdot 1$) over that of the preceding month, while that of the night only increases one degree. In April, when there is a further increase in the mean maximum or day temperature of nearly six degrees ($5^{\circ}\cdot 9$), that of the night amounts only to three and one-third ($3^{\circ}\cdot 3$). In May, this disproportionate increase in the day still continues, there being during this month a rise of upwards of seven degrees ($7^{\circ}\cdot 2$), while that of the night amounts only to five and a half ($5^{\circ}\cdot 7$).

During the succeeding three months of June, July, and August, the range of temperature continues tolerably uniform, but varies again in the four succeeding months (September, October, November, and December) of the year, when the day temperature falls relatively to a greater extent than that of the night; hence, during the night season, a somewhat uniform temperature is maintained, while that of the day is, as regards the preceding months, disproportionately lowered.

By grouping certain of the months together, this want of uniformity in the day and night temperature is rendered more striking; for instance, during March, April, and May, there is an increase in the maximum temperature of upwards of sixteen degrees ($16^{\circ}\cdot 3$), while, during this same period, there is, in the minimum temperature, only a corresponding rise of ten degrees. Again, in the fall of the year, during September, October,

TABLE 7.—*Mean variation in the maximum and minimum temperature, in successive seasons.*

	Winter.	Spring.	Summer.	Autumn.
Maximum	-5° .	$+14^{\circ}\cdot 6$	$+7^{\circ}\cdot 0$	$-16^{\circ}\cdot 6$
Minimum	-5° .	$+9^{\circ}\cdot 1$	$+5^{\circ}\cdot 9$	$-10^{\circ}\cdot 0$

November, and December, there is an aggregate fall in the maximum of twenty-three degrees, while in the minimum it amounts only to sixteen degrees ($16^{\circ}3$).

The temperature of the air, as indicated by thermometers exposed to free radiation—*i.e.*, the one to the sun, four feet from the surface of the ground, the other lying upon the grass,—does not materially alter the above relations of increment and decrement of temperature, the general average being a temperature in the sun higher by three degrees ($3^{\circ}2$), and in the shade lower by two ($2^{\circ}3$), than the corresponding temperature in the shade (*vide* Table 8).

The period in which there occurs the greatest amount of difference from that of the surrounding air, are the spring and summer months—the seasons of clear and open skies.

The temperature of the air in the direct rays of the sun does

TABLE 8.—Mean temperature as influenced by solar and terrestrial radiation for five years.

	Thermometer exposed to the		Difference in the preceding columns.	Difference from mean temperature in shade.	
	Sun.	Sky.		Max.	Min.
January	46.4	33.2	13.2	+ 0.7	- 1.7
February.....	48.9	29.3	19.6	2.7	2.1
March.....	54.3	32.3	22.0	3.6	3.1
April	57.1	36.4	20.7	3.8	2.9
May.....	66.2	42.1	24.1	3.9	2.0
June	72.2	48.3	23.9	4.3	2.0
July.....	75.2	51.6	23.6	4.6	2.4
August	75.2	50.6	24.6	5.0	2.7
September	72.1	46.2	25.9	5.1	2.8
October	61.9	42.7	19.2	3.6	2.2
November	50.9	35.6	15.3	1.1	1.5
December	47.6	34.7	12.9	0.3	2.2
Winter	49.2	31.6	17.6	2.3	2.3
Spring.....	65.2	41.6	23.6	4.0	2.3
Summer	74.2	49.4	24.8	4.9	2.6
Autumn	53.4	37.6	15.8	1.6	1.9
Mean	60.6	40.2	20.4	3.2	2.3

not appear to be so great as might have been expected; the average for the whole year being only three degrees ($3^{\circ}2$). In December, the thermometer exposed to the sun's rays four feet from the ground, indicates an average temperature scarcely higher than that of the surrounding air ($0^{\circ}3$). This sun temperature gradually increases during the succeeding months, till the mean maximum difference of five degrees ($5^{\circ}0$ and $5^{\circ}1$) is attained in August and September, after which time it rapidly falls, in October to three degrees and a half ($3^{\circ}6$), and in November to one degree ($1^{\circ}1$).

In the autumn and winter, the sun's rays have an average temperature above the mean maximum daily temperature of not quite two degrees ($1^{\circ}8$), while in spring and summer it amounts to about four and a half ($4^{\circ}4$).

The increase and decrease of temperature of the direct rays of the sun are not, *pari passu*, the same as the mean climate, and at certain seasons they retain a power which, apparently, is not communicated to the great mass of the atmosphere: thus the average amount of temperature, as indicated by an exposed thermometer in August, is greater than in July, though the mean temperature of the air in this latter season has really diminished; and so also in September, though the temperature of the sun's rays has somewhat declined, the mean climate has much more so; hence, during these two months, the temperature in the sun is, as compared with other months, disproportionately higher than is that in the shade.

These differences between the temperature of the solar rays and the general temperature of the air may materially influence the character of the weather immediately succeeding. The mass of the earth heated by a previously free solar radiation presents elements which cannot belong to it when such radiation has been prevented by cloudy skies, and hence it offers conditions, differing, as the case may be, calculated to determine to a certain extent the character of the subjacent atmosphere.

RANGE OF TEMPERATURE.—The temperature, in its average or mean condition, has hitherto been considered; but the climate of a district cannot be satisfactorily appreciated without some reference to that which is extreme and exceptional. In the whole thirty years, from observations in which the preceding conclusions have been drawn, it would appear that the maximum in the shade attained was ninety-four degrees, while the minimum was thirteen, so that the range of temperature during this period has been eighty-one degrees (*vide* Table 1, p. 4). The range, however, must be now somewhat extended. In the unprecedented cold of the 7th of January, 1861, the minimum temperature registered in Exeter was twelve degrees, the exposed thermometer registering at the same time seven degrees.

The mean annual range of temperature is nearly sixty degrees ($59^{\circ}9$). The greatest annual range (68°) took place in 1830, when there was an extreme maximum in July of eighty-four degrees, and a minimum in December of sixteen. The smallest range is fifty-three degrees, and has occurred in 1824, 1832, and 1834. Take it altogether, the range is not very varying, the average of sixty degrees being that to which the greater number of years most nearly approximates.

The mean of the extreme maximum temperature for each month is rather more than sixty-five degrees ($65^{\circ}4$), and that of the extreme minimum thirty-four degrees; the mean monthly range of temperature is, therefore, thirty-one degrees. The minimum range is in January (28°); and it gradually ascends to May (35°), when it as gradually diminishes during the remaining months of the year. There have been times when the monthly range has exceeded forty degrees, and even attained the maximum of forty-six, while so even a temperature has been maintained as the range to be below twenty-one degrees (*vide* Table 9, p. 14).

In the various tables from which the statements of the previous pages have been deduced, the several months and seasons

of the year have a stated and definite temperature; but it must not be inferred from this that the months always maintain this same relative position towards each other; for instance, July is, on the average, the hottest month of the twelve; nevertheless, out of the thirty years, in six August, and in five June, have been warmer months. So also January, which, on the average, is the coldest month, has been in the course of the thirty years a warmer month than February, twelve times; than March, seven times; and than its immediately preceding December, six times; and this variation obtains through the remaining months.

FROST.—Frost occasionally occurs (*vide* Table 2, p. 5), in all the months, from October to May inclusive. In the remaining four months, the temperature never falls below the freezing point. During the whole thirty years the temperature has invariably, at one time or another, in each year, fallen to many degrees of cold lower than the freezing point (*vide* Table 1, p. 4), the mean of these annual lowest temperatures being twenty-one degrees, or eleven degrees of frost.

Though the occurrence of frost during the four months of December, January, February, and March, is not infrequent, yet it is unusual for a temperature so low as the freezing point to be maintained during many consecutive days; hence the average winter climate is comparatively mild. About once in five years, however, severe winters occur, and a temperature so low is attained as to freeze the rivers and the running waters.*

TABLE 9.—*Mean of the extreme maximum and minimum temperature for each month.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean.
Maximum	53	54	58	64	72	77	79	77	72	64	59	55	65.4
Minimum	24	25	27	31	37	44	46	46	41	33	28	26	34
Range ...	29	29	31	33	35	33	33	31	31	31	31	29	31.4

* Though unable to offer a perfect record of the various dates, at which the river Exe has been, in recent years, frozen over, the following are an approxi-

On these occasions the temperature generally falls below twenty-four degrees, and is sustained below the freezing point for many days.

The average number of degrees of frost registered in each year* is one hundred and ninety, varying from four hundred and thirty to thirty-four degrees. Though this mode of stating the amount of frost may not accurately describe either the occasional intensity or continuance of frost during any one season, yet it contributes towards an estimate of its character; hence the winters of 1847, 1855, 1860, and 1861 having each more than two hundred and seventy degrees of frost, may be considered as severe; while those of 1844, 1846, 1848, 1849, and 1859 having less than a hundred, may be stated as mild.

Before leaving the subject of temperature, some of the unusual and remarkable extremes of temperature may be alluded to. In 1825, on the 19th of July, the wind blowing from the eastward, the temperature rose to the unusual height, in the

mation: 1816, 9th February; 1823, from January 10—27; 1829, January 27; 1835, December 21—23; 1838, January 14; 1844, March 14—18, December 8, 9, and 23; 1845, January 7; 1848, January 24—28; 1849, December 31; 1850, January 9, 15, and 16; 1853, March 24, December 29, and 30; 1854, November 26; 1855, January 18—27, February 11—20; 1858, November 22; 1859, December 18—20; 1860, December 21; 1861, January 7, November 20.

* Mr. White, of St. Thomas's, who has been an accurate observer of the weather for many years, has furnished me with the following extracts from his journal.

TABLE 10.—*The amount of degrees of frost registered in the winters of—*

1844.	1845.	1846.	1847.	1848.	1849.	1850.	1851.	1852.	1853.	1854.	1855.	1856.	1857.	1858.	1859.	1860.	1861.	Average
34	306	47	276	98	83	216	111	222	206	190	430	205	179	160	85	273	300	190

Years when the thermometer has been 16° and under.

1829—December 21,	...	...	11	1845—March 14, -17,	...	...	15
1830—January 1,	...	...	13	1847—February 12,	...	...	16
1835—December 24,	...	...	15	1855—February 15,	...	...	15
1838—January 20,	...	...	15	1859—December 17,	...	...	12
1840—December 16,	...	...	16	1861—January 7,	...	...	8
1841—January 8,	...	...	9				

shade, of ninety-five degrees, and in the sun, of one hundred and thirty-two. In 1835, on the 17th August, the wind blowing from the east, the temperature was eighty-two degrees; three days afterwards, the wind being from the south-east, and the barometer having fallen three-tenths of an inch, the temperature rose to eighty-six degrees. In 1828, on the 18th of January, the wind blowing from the south-west, the temperature was as high as fifty-six degrees; so mild and genial was the atmosphere, that the birds were singing as in spring, and boys were actually bathing in the river Exe. Almost similar mildness characterized the latter end of December, 1833, when, on the 30th, the thermometer stood at fifty-three degrees, the wind being from the westward; and the beginning of January, 1834, the thermometer being at forty-five degrees, the wind from the north-west. In 1829, on the 25th of January, the wind from the north-east, the temperature was as low as twelve degrees—a very unusual occurrence in this district. On the 1st of January of the following year, the thermometer marked a temperature nearly as low (14°), the wind blowing also from the north-east, and the barometer standing at a high point.

WIND.—The direction and force of the wind are circumstances of material importance in the appreciation of a local climate. For the most part, the tendency of the air in this district is to gentle and light breezes. The winds that more particularly prevail are the west and the north-west; the easterly winds, with its variations from the north and south, being the least frequent.

Years when the thermometer has been 80° and above.

1825—July 19,	94	1844—July 28,	82
1830—July 29,	84	1845—June 16,	81
1831—June 29,	83	1846—June 20,	87
1832—June 28,	80	1847—July 15,	85
1835—July 28,	86	1852—July 7,	84
1840—August 30,	80	1854—July 25,	84
1841—July 4,	82	1856—August 1, 3, 4,	85
1842—August,	82	1857—August 23,	81
1843—August 18,	81	1858—July 31,	80

The east and south-easterly winds prevail chiefly during May, July, and October; the west and north-westerly winds in June, November, February, December, and March; no winds blowing in any one month so constantly as these do in the month of

TABLE 11.—*Average annual frequency of each wind.*

N.	S.	E.	W.	N.E.	N.W.	S.E.	S.W.
32·8	41·4	29·7	73·7	42·8	57·8	41·4	44·8

Average annual frequency of each wind arranged under the four cardinal points.

North, including N.E. and N.W.	South, including S.E. and S.W.	East, including N.E. and N.W.	West, including N.W. and S.W.
133·2	127·6	130·1	176·1

Relative average frequency of the winds in each month.

	N.	S.	E.	W.	N.E.	N.W.	S.E.	S.W.
January.....	3·8	2·4	3·9	3·8	6·1	5·3	2·8	2·8
February	2·2	2·3	1·5	6·9	3·1	4·5	3·6	4·3
March	2·3	1·7	4·0	6·5	4·5	5·6	3·7	2·6
April	4·1	2·9	2·9	5·6	3·4	4·6	4·0	2·3
May	2·1	4·4	3·0	3·7	5·0	4·7	5·5	2·6
June	1·9	3·0	1·4	7·4	2·3	5·0	3·7	4·3
July	2·0	4·1	1·6	4·2	3·6	5·2	4·4	3·5
August	2·5	3·9	·8	6·4	3·5	4·6	2·4	4·7
September.....	1·9	3·7	3·0	6·5	2·6	4·0	2·9	5·2
October	3·4	5·6	2·4	7·0	1·2	3·5	3·2	5·5
November	3·5	2·6	2·2	7·6	3·4	4·8	2·7	3·2
December	2·8	3·7	2·1	7·0	4·0	4·4	2·7	4·5

Prevailing wind for each month.

Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
N.E.	W.	W.	W.	S.E.	W.	N.W.	W.	W.	W.	W.	W.

In the above table the eight leading divisions of the compass are adhered to. Luke Howard, however, prefers including all the winds in four divisions. For the sake of comparison they are so arranged in the following tables :

June. In September, the south and south-westerly winds prevail, and the north and north-easterly in January.

The temperature of the air is necessarily much modified by the prevailing wind (*vide* Table 11). Taking the average of the whole year, the south and south-westerly winds are attended by the highest temperature; and the north and north-easterly by the lowest. This is not, however, maintained during every period of the year; in fact, the temperature, not only of these, but of all the winds, varies absolutely, as well as relatively, during the several months. The east and south-easterly winds, for instance, are accompanied by a temperature higher than any other winds in May, but in February, by nearly the lowest; and the north and north-easterly winds, which have just been spoken of as being on the yearly average the coldest, are during the

Relative proportion of winds for ten years.

	N.W.—W.	S.W.—S.	S.E.—E.	N.E.—N.
Exeter, 1825-34...	131·3	86·2	71·1	75·6
London, 1807-16...	100·4	104·4	53·9	74·4

Average temperature during the several winds.

N.W.—W.	S.W.—S.	S.E.—E.	N.E.—N.
51°·75	53°·49	50°·85	48°·32

Average temperature during the several winds in each month, for seven years.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
N.W.—W.	43°·3	43°·8	47°·0	48°·5	56°·0	59°·0	60°·9	61°·2	56°·1	52°·2	47°·1	45°·9
S.W.—S. ...	46°·3	47°·4	47°·3	51°·7	55°·6	60°·0	63°·7	61°·1	58°·1	52°·4	50°·1	48°·2
S.E.—E. ...	37°·6	37°·0	44°·1	49°·5	56°·4	59°·5	66°·2	64°·1	60°·0	52°·4	44°·5	39°·0
N.E.—N...	35°·3	36°·7	40°·5	46°·7	51°·3	61°·3	63°·8	61°·0	55°·5	50°·0	41°·5	36°·3

Average temperature during the several winds in each season.

	N.W.—W.	S.W.—S.	S.E.—E.	N.E.—N.
Winter	44°·3	47°·3	40°·2	36°·1
Spring.....	47°·1	51°·5	50°·0	46°·1
Summer	60°·3	61°·6	63°·2	62°·0
Autumn	51°·8	53°·5	52°·3	48°·0

month of June warmer even than the south and south-westerly. In fact, they are the coldest of all the winds in winter, and the warmest in summer. It is evident, therefore, that the temperature of the different winds varies very considerably: the north and north-easterly winds exhibit an extreme mean variation of nearly twenty-nine degrees ($28^{\circ}8$); the east and south-easterly winds of more than twenty-eight degrees and a half ($28^{\circ}6$); the south and south-westerly of nearly twenty degrees ($19^{\circ}9$); and the north and north-westerly of only about eighteen degrees ($17^{\circ}9$). This relative alteration of temperature is easily understood, when we regard the points from which the several winds proceed, and the tracts they may probably pass over. The west and north-westerly, though blowing from the cold latitudes, yet from passing chiefly over ocean, are not only modified in temperature, but are rendered more equable than any of the other winds; while the north and north-easterly, coming certainly from latitudes still colder, are not only the coldest, but, from passing over large masses of land, are subject to greater variations. This is also the case with the east and south-easterly winds, the difference in whose mean is not much less. The south and south-westerly winds are also modified considerably from passing over the North Atlantic.

As previously observed, the tendency of the air in this district is to gentle and light breezes. Estimating the force of the wind from 0—6, the average is 1.9 (*vide* Table 12). The air is for the most part still and breezy from May to November; in December it moves with greater force, and so continues through the several months to April.

Though this may be the average state of the air, there are, of

TABLE 12.—Average force of wind in each month, the force being estimated from 0—6.

Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Average
2.0	2.1	2.1	2.1	1.9	1.8	1.7	1.7	1.9	1.8	1.6	2.0	1.9

course, times in which it blows with considerable violence, and extraordinary storms are the result. Those of notable and peculiar violence in recent years, have come from the westward, preceded to within one or two days by winds blowing from the northern points of the compass. Usually these storms, which are accompanied by heavy rains, thunder and lightning, and a slight elevation of temperature, have been succeeded by mild, open, agreeable weather.

From amongst these storms the following may be particularised as unusually violent. November 23, 1824, a tempest of wind from the south-west, with thunder, lightning, and rain, so heavy as to cause extensive local floods. Thermometer 48° . Two days previously the wind had been from the north-east and north-west, and the temperature 41° .

January 12, 1828.—A storm from the westward and south-westward, accompanied with lightning and heavy rain, and a temperature of 46° . To within twenty-four hours previously the temperature had been 38° , and the wind blowing from the north-east and south-east.

February 20, 1833.—A tempest commenced at 6 a.m., and continued till noon. The wind being from the westward, with a temperature of 41° , was preceded two days previously by north-westerly winds and a temperature of 38° . In this storm, elm and other trees were torn up by the roots in all directions.

March 29, 1836.—During the night season gales from the westward, with hail and rain, and a temperature of 41° , preceded by varying winds from the north-west and south-east, with frost, snow, and a temperature of 32° . In these gales many vessels were wrecked upon our coast.

On the 28th of November of the same year, a remarkable hurricane occurred. At 8 a.m. the sky became clouded, and some drizzling rain fell; about 9 a.m. a brisk wind arose from the

south-west (the barometer having fallen considerably), which quickly increased to a violent tempest: trees were torn up, houses unroofed; masses of lead were rolled from their places like sheets of paper, and carried to the distance of many yards; slates and portions of buildings fell in all directions like hail. Nothing could exceed during this period the dreary character of the atmosphere. Shortly after 10 a.m., the hurricane subsided, the clouds were dissipated, the clear blue sky being only here and there traversed by long ranges of cirri. The aspect which the sky now presented was serene and quiet; the air became warm and pleasant; and, but for the universal scene of devastation around, nothing indicated the convulsion that had so lately taken place. This hurricane, according to the best calculations I could make, passed over this district at the rate of eighty miles in the hour; the pressure on each square foot considerably exceeding thirty pounds at the period of its greatest violence.

February 4, 1840.—Gales of wind from the north-west, changing from the south-east; the thermometer rose from 42° to 46° , the barometer falling so low as 28·10 inches.

January 13, 1843.—A tempest, also accompanied by a remarkable fall in the barometer. On the 12th, at 9 p.m., the wind being from the north, the barometer was at 29·35 inches, the thermometer at 37° . On the 13th, at 9 a.m., the barometer was at 28·10 inches, the wind from the south-west, and the thermometer at 43° .

In the storm of the 25th and 26th of October, 1859, which raged with great fury in the West of England, on the 25th, at 9 a.m., the barometer in Exeter was at 29·312 inches; at 9 p.m. 28·910; on the 26th, at 9 a.m., at 29·324: the wind, during this time, shifting from the north-east to the north-west.

In the hurricane of the 21st of February, 1861, the barometer, at 9 a.m., was at 29·43 inches; it fell half an inch

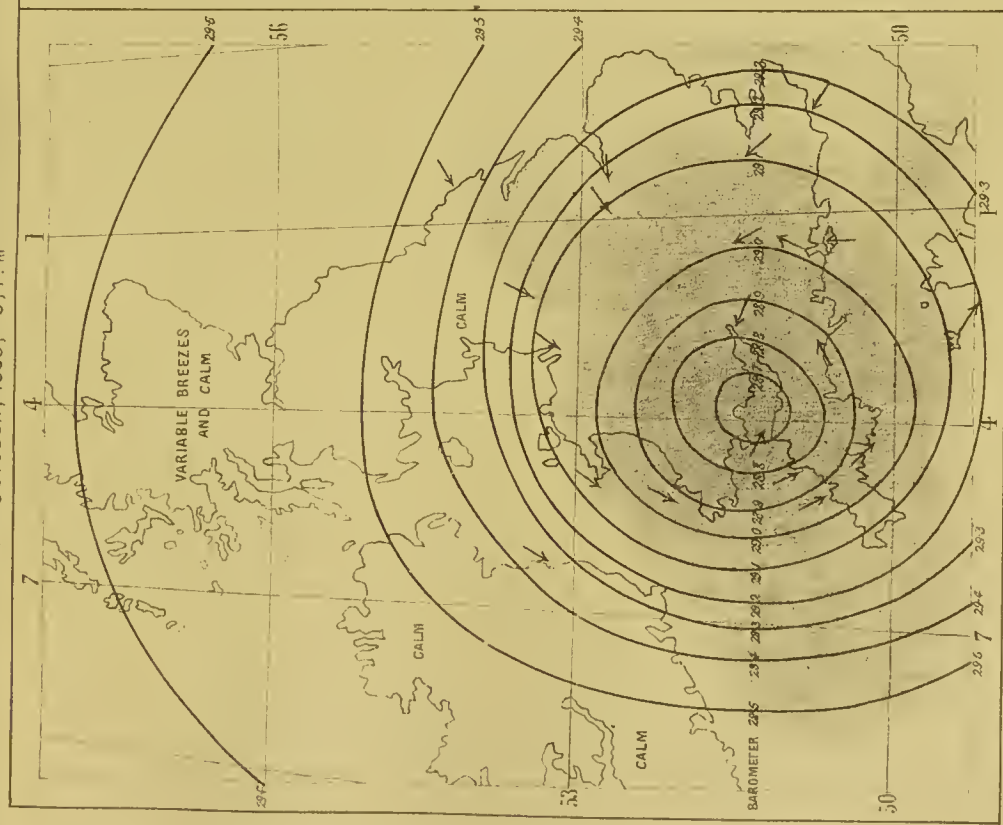
between then and 5 p.m., from which time to 10 p.m. it rose four-tenths of an inch. The wind, which at 4 p.m. had been westerly, shifted to the south-west; the temperature being at 51° . Between the hours of 3 and 5 p.m. the force of the wind was so great as to uproot many large trees in the neighbourhood.

The investigations of Redfield, Reid, and Piddington have shown most conclusively that British storms, similar to the above, are of the nature of the cyclones of tropical regions,—possessing their essential characteristic of circularity, and invariably taking place in this northern hemisphere in the contrary direction of the movement of the hands of a watch laid face uppermost. Moreover, in all the above recorded storms, those other circumstances attendant on cyclones are observable—the barometer is depressed to rise afterwards, the temperature rises, and the wind shifts from northerly to southerly points, while the movement of the air invariably commences from the westward, and that of the cyclone in its parabolic orbit is to the eastward. As a general rule it may be stated that, in one of these hurricanes, if facing the direction of the wind, the centre of the cyclone is towards the right hand. The explanation of this is, that they originate between the tropics, and rotate outwards from the equator towards the pole.

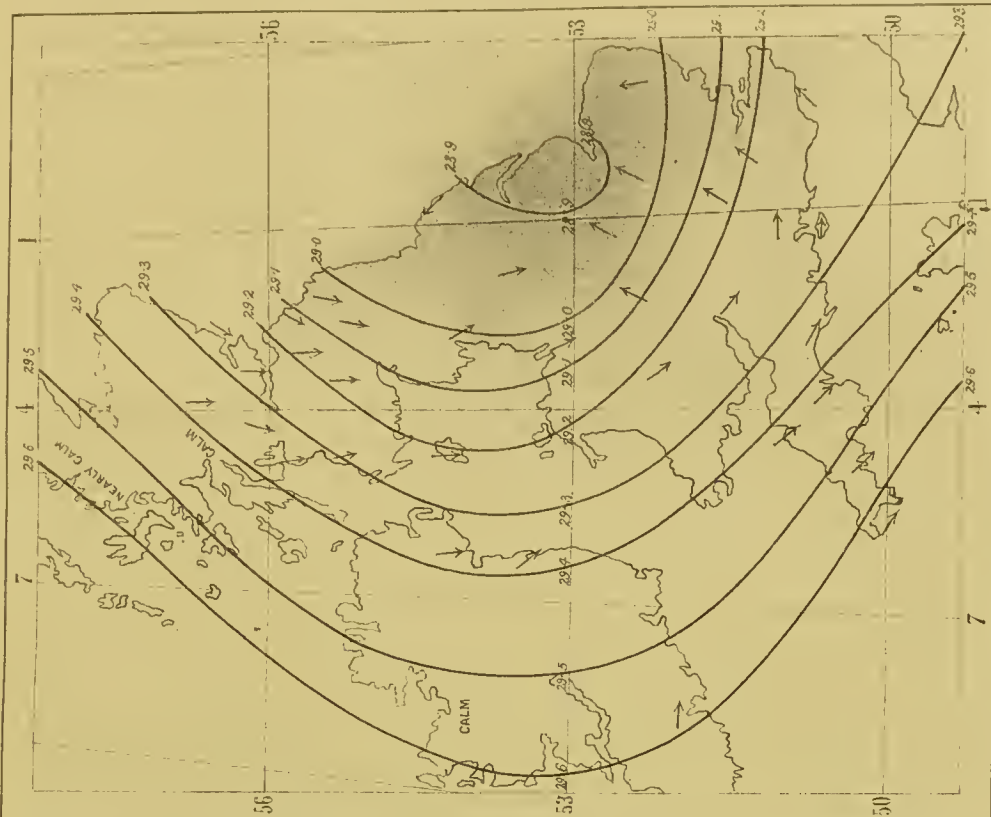
The chart of the storm of the 25th and 26th of October, 1859, which is appended (*vide* opposite), fully illustrates the above. The centre of the cyclone traversed a parabolic curve to the eastward, while the movement of the air in the west of England was from the north-west and west, the various barometric measurement at the same time showing its strictly circular character.

the surface pressure, the storm was over when a gale was blowing at the time.

25TH OCTOBER, 1859, 9, P. M.



26TH OCTOBER, 1859, 9, A. M.



1859 OCT 25

LONDON, John Churchill, New Burlington Street.

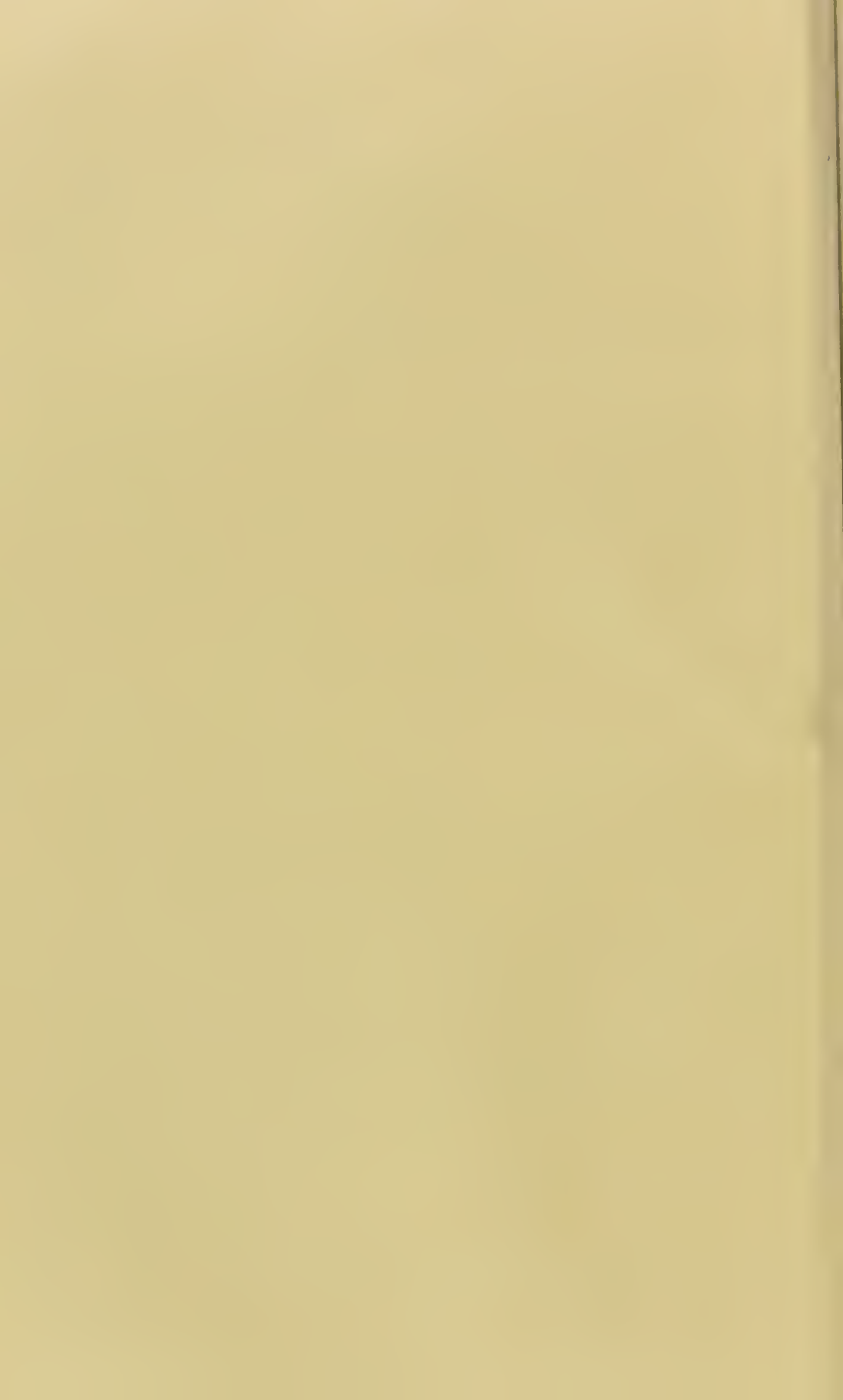


TABLE 13.—Mean reading of the barometer at Exeter, corrected and reduced to 32° and sea-level.

	1849.	1850.	1851.	1852.	1853.	1854.	1855.	1856.	1857.	1858.	1859.	1860.	Mean.	Lower at 3 p.m. than at 9 a.m.
January	Inches. 29-986	Inches. 30-041	Inches. 29-799	Inches. 29-811	Inches. 29-763	Inches. 29-794	Inches. 30-227	Inches. 29-635	Inches. 29-885	Inches. 30-376	Inches. 30-250	Inches. 29-717	Inches. 29-940	Inches. 018
February	30-336	30-080	30-072	30-128	29-765	30-324	29-760	30-057	30-114	29-987	30-036	30-128	30-066	019
March	30-125	30-243	29-783	30-185	29-982	30-381	29-756	30-171	29-915	30-011	30-057	29-907	30-043	025
April	29-704	29-741	29-920	30-119	29-940	30-183	30-159	29-781	29-829	29-963	29-827	30-011	29-931	020
May	29-948	29-899	30-090	29-970	29-938	29-862	29-885	29-861	29-967	29-977	29-994	29-949	29-945	014
June	30-049	30-095	30-094	29-744	29-936	29-935	30-051	30-098	30-035	30-124	29-991	29-800	29-996	009
July	29-996	30-112	29-921	30-045	29-943	29-997	29-951	30-051	30-079	30-002	30-150	30-048	30-025	009
August	30-028	30-002	30-104	29-850	29-998	30-112	30-062	29-942	30-043	30-048	30-032	29-783	30-000	013
September	29-915	30-117	30-230	29-963	30-053	30-214	30-164	29-864	29-975	30-056	29-941	29-954	30-037	021
October	29-915	29-917	29-942	29-898	29-714	29-933	29-669	30-156	29-877	30-039	29-721	30-045	29-902	019
November	29-914	29-984	30-067	29-614	30-102	29-955	30-056	30-153	30-117	29-915	30-007	29-860	29-979	020
December	29-993	30-118	30-341	29-756	29-973	30-089	29-917	29-867	30-328	29-965	29-820	29-684	29-987	016
Mean	29-992	30-029	30-030	29-924	29-926	30-065	29-971	29-970	30-014	30-038	29-985	29-907	29-988	017

BAROMETER.—The mean annual height of the barometer in Exeter, corrected and reduced to 32° at the sea-level, is 29·988 inches (*vide* Table 13, p. 23). The average annual variation amounts only to 0·052, the extreme between any two years being 0·131; nor is the mean variation during the several months very considerable; the difference between the lowest and that of the highest being only 0·164.

TABLE 14.—*Highest and lowest readings of the barometer at Exeter for rected and reduced*

	JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
1817	30·65	28·59	30·70	29·72	30·69	29·12	30·66	29·98	30·33	29·29	30·40	29·29
1818	30·59	29·03	30·35	29·02	30·50	28·58	30·47	29·18	30·40	29·41	30·40	29·79
1819	30·61	29·14	30·26	29·26	30·39	29·25	30·31	29·21	30·30	29·53	30·37	29·57
1820	30·81	29·02	30·43	29·59	30·48	29·05	30·59	29·20	30·39	29·26	30·51	29·61
1821	30·87	29·09	30·88	29·25	30·45	29·04	30·29	29·27	30·39	29·27	30·44	29·73
1822	30·57	29·36	30·79	29·36	30·61	29·65	30·52	29·32	30·40	29·37	30·33	29·77
1823	30·27	29·08	30·36	28·67	30·53	29·05	30·54	29·16	30·49	29·39	30·43	29·36
1824	30·73	28·99	30·63	29·06	30·44	29·15	30·53	29·25	30·68	29·53	30·43	29·34
1825	30·98	29·61	30·67	29·66	30·70	29·26	30·54	29·29	30·45	29·66	30·43	29·53
1826	30·59	29·59	30·56	29·36	30·47	29·50	30·44	29·30	30·37	29·73	30·51	29·93
1827	30·43	29·51	30·66	29·59	30·39	28·80	30·43	29·47	30·26	29·33	30·37	29·65
1828	30·56	29·24	30·60	28·92	30·45	29·16	30·39	29·19	30·39	29·23	30·40	29·45
1829	30·43	29·06	30·63	29·06	30·39	29·25	30·16	28·74	30·50	29·65	30·43	29·46
1830	30·70	29·29	30·42	29·49	30·67	29·52	30·26	29·30	30·33	29·39	30·17	29·41
1831	30·70	29·03	30·50	29·10	30·52	29·28	30·52	29·11	30·31	29·49	30·28	29·75
1832	30·56	29·32	30·66	29·31	30·39	29·44	30·58	29·43	30·53	29·33	30·43	29·49
1833	30·70	29·41	30·73	29·06	30·41	29·25	30·35	29·03	30·51	29·45	30·39	29·43
1834	30·52	28·96	30·59	29·78	30·60	29·61	30·59	29·28	30·53	29·45	30·39	29·55
1835	30·82	29·32	30·64	29·16	30·67	29·00	30·59	29·59	30·25	29·53	30·43	29·39
1836	30·73	29·26	30·56	28·91	30·40	28·55	30·49	29·08	30·63	29·31	30·34	29·59
1837	30·66	29·33	30·39	29·26	30·55	29·35	30·49	29·45	30·43	29·68	30·40	29·55
1838	30·38	29·36	30·46	28·56	30·59	29·02	30·39	29·14	30·40	29·51	30·33	29·57
1839	30·70	29·23	30·60	29·41	30·15	29·41	30·54	29·49	30·23	29·45	30·36	29·43
1840	30·58	29·10	30·60	28·36	30·72	29·90	30·47	29·60	30·45	29·43	30·31	29·79
1841	30·52	28·99	30·49	29·03	30·51	29·32	30·21	29·36	30·43	29·33	30·47	29·49
1842	30·60	29·22	30·60	29·16	30·46	28·87	30·42	29·28	30·46	29·36	30·39	29·68
1843	30·59	28·30	30·09	28·90	30·45	29·37	30·16	29·40	30·25	29·40	30·23	29·25
1844	30·51	29·34	30·36	28·69	30·52	29·32	30·58	29·61	30·45	29·88	30·30	29·72
1845	30·36	28·93	30·43	29·49	30·52	29·58	30·38	29·01	30·37	29·50	30·43	29·35
1846	30·68	28·88	30·48	29·43	30·69	29·28	30·40	29·12	30·39	28·97	30·88	29·46
1847	30·36	29·06	30·36	29·46	30·59	29·45	30·11	29·36	30·55	29·41	30·55	29·53
1848	30·35	29·27	30·49	28·48	30·30	28·77	30·12	29·24	30·37	29·35	30·18	29·26
1849	30·64	29·02	30·90	29·32	30·71	29·23	30·30	29·26	30·29	29·32	30·26	29·69
1850	30·61	29·48	30·49	29·05	30·69	29·40	30·42	29·01	30·32	29·40	30·41	29·52
1851	30·41	29·07	30·51	29·23	30·49	28·70	30·24	29·45	30·51	29·58	30·49	29·55
1852	30·43	29·11	30·71	29·34	30·81	29·23	30·43	29·61	30·34	29·64	30·09	29·26
1853	30·32	29·02	30·25	28·96	30·32	29·34	30·45	29·30	30·18	29·55	30·21	29·62
1854	30·60	28·74	30·79	29·68	30·77	29·86	30·62	29·43	30·32	29·18	30·24	29·60
1855	30·66	29·41	30·14	29·30	30·53	28·93	30·56	29·41	30·15	29·45	30·42	29·26
1856	30·73	28·99	30·60	29·59	30·69	29·79	30·33	29·20	30·30	29·47	30·38	29·58
1857	30·43	29·03	30·60	29·40	30·61	29·15	30·41	29·02	30·30	29·33	30·41	29·53
1858	30·75	29·88	30·36	29·58	30·59	29·08	30·43	29·23	30·54	29·16	30·44	29·85
1859	30·88	29·32	30·71	29·29	30·49	29·17	30·30	28·99	30·25	29·68	30·25	29·57
1860	30·33	28·73	30·68	29·36	30·62	28·80	30·47	29·02	30·44	29·40	30·33	29·08
Mean	30·590	29·154	30·589	29·220	30·534	29·223	30·420	29·231	30·392	29·444	30·367	29·529
Range	1·436		1·319		1·311		1·159		·948		·833	

Mean Monthly Maximum.... 30·451 inches.
Range

The barometer attains its highest mean range in February, when it stands at 30·066; it falls slightly in March, but more considerably in April; it then gradually rises till July, when a mean height of 30·025 inches is attained. There is a slight fall in August, with another rise in September, which is followed by the mean lowest fall of October, when it stands at 29·902; on this there is a slight rise both in November and December.

every month during forty-four years. Readings of the barometer corrected to 32° and sea-level.

JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
30·19	29·45	30·22	28·98	30·33	29·37	30·46	29·36	30·67	29·41	30·29	28·75
30·38	29·82	30·34	29·82	30·41	29·27	30·41	29·44	30·49	29·45	30·69	29·39
30·30	29·36	30·39	29·25	30·55	29·60	30·46	29·49	30·22	29·37	30·33	29·31
30·35	29·44	30·37	29·58	30·45	29·59	30·67	28·82	30·38	29·52	30·47	29·45
30·39	29·62	30·26	29·64	30·35	29·60	30·44	29·13	30·40	29·32	30·35	28·13
30·32	29·47	30·32	29·54	30·33	29·33	30·21	29·27	30·41	29·30	30·60	29·10
30·19	29·64	30·36	29·56	30·44	29·15	30·54	28·98	30·67	29·59	30·65	29·19
30·59	29·72	30·44	29·73	30·36	29·33	30·36	28·79	30·37	28·25	30·58	29·12
30·39	29·86	30·43	29·08	30·37	29·51	30·62	29·15	30·45	28·85	30·23	29·05
30·34	29·69	30·38	29·60	30·33	29·39	30·31	29·49	30·55	29·08	30·67	29·35
30·49	29·72	30·47	29·39	30·40	29·51	30·44	29·04	30·53	29·43	30·69	29·25
30·09	29·39	30·34	29·28	30·57	29·46	30·49	29·34	30·40	29·21	30·42	29·20
30·29	29·34	30·30	29·42	30·28	29·11	30·52	29·56	30·50	29·65	30·65	29·65
30·32	29·42	30·31	29·42	30·39	29·27	30·59	29·87	30·45	29·18	30·55	28·90
30·36	29·64	30·36	29·64	30·33	29·45	30·48	29·17	30·62	29·39	30·52	28·86
30·47	29·80	30·35	29·22	30·59	29·71	30·44	29·34	30·48	29·55	30·59	29·60
30·49	29·68	30·44	29·36	30·53	29·29	30·29	29·29	30·41	29·09	30·31	29·41
30·32	29·62	30·22	29·62	30·53	29·50	30·74	29·58	30·55	29·39	30·71	29·47
30·25	29·78	30·39	29·52	30·21	28·98	30·44	29·04	30·50	29·10	30·65	29·37
30·50	29·55	30·32	29·64	30·28	29·31	30·50	28·96	30·21	28·85	30·77	29·13
30·32	29·32	30·34	29·40	30·34	29·16	30·72	29·42	30·45	29·19	30·50	29·35
30·34	29·60	30·32	29·34	30·57	29·27	30·44	29·18	30·45	28·61	30·71	29·28
30·39	29·29	30·40	29·15	30·20	28·07	30·42	29·36	30·35	29·17	30·42	29·10
30·36	29·58	30·32	29·29	30·30	28·83	30·60	29·22	30·47	28·62	30·72	29·22
30·25	29·42	30·36	29·55	30·15	29·23	30·07	28·88	30·49	28·89	30·25	28·93
30·46	29·69	30·48	29·68	30·33	29·39	30·54	29·00	30·58	28·85	30·60	29·42
30·35	29·70	30·34	29·40	30·59	29·63	30·38	29·10	30·50	29·29	30·65	29·75
30·34	29·49	30·32	29·35	30·43	29·75	30·30	28·99	30·41	29·00	30·32	29·28
30·32	29·57	30·39	29·22	30·85	29·43	30·62	29·36	30·45	29·18	30·57	28·85
30·28	29·29	30·30	29·62	30·48	29·40	30·34	28·96	30·52	29·27	30·62	28·69
30·35	29·76	30·42	29·50	30·29	29·43	30·39	29·42	30·51	28·98	30·45	28·57
30·50	29·36	30·15	29·49	30·45	29·34	30·17	29·30	30·57	29·13	30·36	29·01
30·40	29·50	30·41	29·65	30·58	29·06	30·69	29·11	30·39	29·17	30·65	29·13
30·26	29·68	30·40	29·66	30·52	29·42	30·49	29·16	30·43	28·76	30·68	29·10
30·22	29·51	30·40	29·80	30·60	29·41	30·45	29·01	30·57	29·52	30·59	29·60
30·19	29·80	30·36	28·87	30·52	29·12	30·55	29·05	30·29	28·86	30·29	29·06
30·35	29·35	30·33	29·19	30·45	29·22	30·10	28·91	30·68	29·72	30·50	29·19
30·26	29·65	30·54	29·70	30·46	29·75	30·62	29·03	30·60	29·02	30·63	29·15
30·27	29·59	30·37	29·68	30·54	29·48	30·20	29·18	30·30	29·56	30·33	29·05
30·31	29·58	30·26	29·07	30·33	28·83	30·52	29·39	30·66	29·54	30·61	28·96
30·40	29·68	30·34	29·73	30·45	29·50	30·30	28·80	30·73	29·35	30·70	29·69
30·30	29·56	30·43	29·66	30·62	29·53	30·63	29·40	30·57	28·94	30·36	29·28
30·39	29·71	30·40	29·70	30·45	29·50	30·24	28·74	30·72	28·93	30·47	28·53
30·43	29·01	30·14	29·37	30·88	29·47	30·48	29·50	30·51	29·33	30·30	28·76
30·342	29·575	30·354	29·463	30·418	29·362	30·448	29·195	30·487	29·178	30·523	29·151
·767		·891		1·056		1·253		1·309		1·372	

Mean Monthly Minimum 29·314 inches.
 1·137 inches.

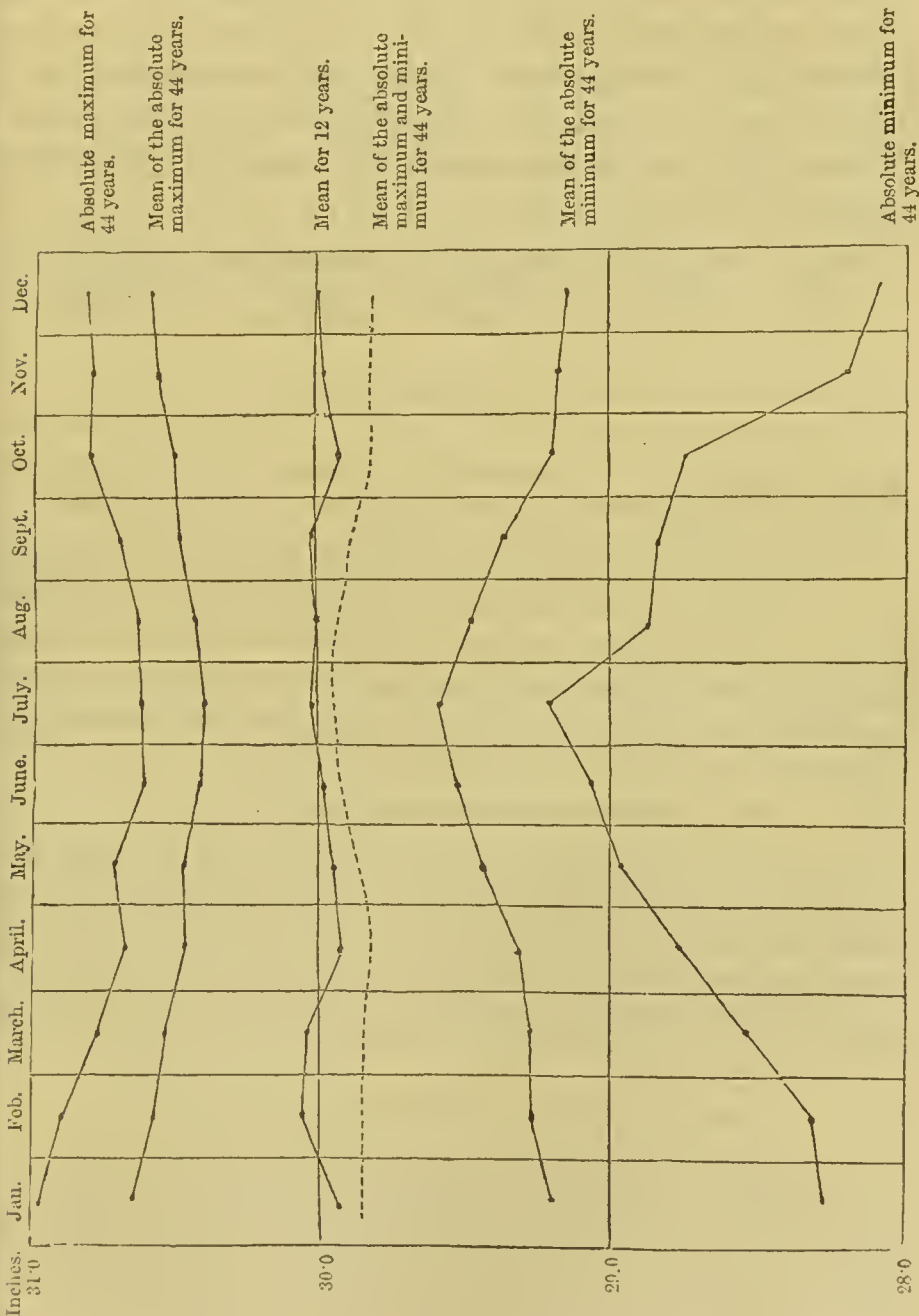
There is a diurnal variation in the height of the barometer. Between 9 a.m. and 3 p.m., a mean fall of 0.017 takes place. During the summer months, *i.e.* from May to August, the average fall is much less, and in June and July is so small as to amount to only 0.009. Doubtless, as in more tropical latitudes, and even at Greenwich, if extended hourly observations had been made, it would be further seen that there were in the course of the twenty-four hours two maxima and two minima.

Though the series of twelve years (1849—1860), from which the above statements have been made, may be sufficiently extended to afford a reasonable conclusion as to the probable mean monthly pressure of the atmosphere, it will be useful to compare it with observations, made during a much longer period, on the absolute maximum and minimum pressure. From the mean of these latter observations, made during each month for forty-four years,* it would appear that, though the curve of the barometric pressure is not subject quite to so much variation, there is no very great divergence between them. It may be stated generally, that in this latter the barometer falls from a maximum in January till April, when it rises to a second maximum (the maximum of the year) in July. It then falls to its minimum in October and November, when it again rises to the end of the year, presenting, in this respect, a striking resemblance to the barometric curve of the North Atlantic. *See Dove's Work, &c. &c.*

In the following diagram (page 27), the various barometric curves for each month are set forth.

* In Table 14 (pp. 24, 25), the numbers from 1817—1829 are deduced from observations taken at the Devon and Exeter Institution, at the hours of 8 a.m., and 2 p.m., and 10 p.m.; from 1830—1840, at 9 a.m. and 9 p.m. For the remaining period, 1841—1860, though these observations have been mainly relied on, other registers have been called into requisition in determining the probable value, especially as, during the latter period of the series, 1850—1860, the barometer at the Institution has been read at the hours of 9 a.m. and 3 p.m., which, though very good in themselves, are not well suited for showing the extreme diurnal readings, inasmuch as eighteen hours elapse without an observation.

The mean maximum highest reading of the barometer for each month is 30·451 inches, and the lowest 29·314, so that there is a mean monthly range of 1·137 inches. From April to September, that is to say, during the summer months, the



mean variations in the readings are not very marked; the range during the winter season is much more considerable; these larger variations occur from October to March, that in January being the most so.

The extreme range of the barometer in the forty-four years under consideration was 2·85 inches. At Greenwich, during the same period, the range was 2·90 inches, and from a register kept by the Rev. C. Clouston, at Sandwick Manse, in Orkney, from 1839 to 1859 inclusive, the range was as much as 3·07 inches; the actual values being—

		Inches.		Inches.
Exeter,	January 10th, 1825,	30·98	December 28th, 1821,	28·13
London,	January 9th, 1825,	30·95	December 25th, 1821,	28·05
Sandwick,	February 1st, 1841,	30·83	January 24th, 1840,	27·76

Mean of the highest and lowest readings of the barometer at Exeter, for each month during forty-four years, with the range reduced and corrected to sea-level at 32°.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean.
Highest	30·590	30·539	30·534	30·420	30·392	30·367	30·342	30·354	30·418	30·448	30·487	30·523	30·451
Lowest	29·154	29·220	29·223	29·281	29·444	29·529	29·575	29·463	29·362	29·195	29·178	29·151	29·314
Mean ..	29·872	29·879	29·878	29·850	29·918	29·948	29·958	29·908	29·890	29·821	29·832	29·837	29·882
Range..	1·436	1·319	1·311	1·139	·948	·838	·767	·891	1·056	1·253	1·309	1·372	1·137

Extremes and range of the barometer.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean.
Highest	30·98	30·90	30·77	30·66	30·68	30·55	30·59	30·54	30·62	30·74	30·73	30·77	30·98
Lowest	28·30	28·36	28·55	28·74	28·97	29·08	29·29	28·87	28·83	28·74	28·25	28·13	28·13
Range	2·68	2·54	2·22	1·92	1·71	1·47	1·30	1·67	1·79	2·00	2·48	2·64	2·85

Greatest and least variation of the barometer in any one month.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean.
Greatest	2·29	2·24	1·92	1·45	1·42	1·25	1·14	1·49	1·50	1·84	2·12	2·22	1·740
Least ..	0·87	0·78	0·74	0·68	0·57	0·52	0·39	0·51	0·68	0·72	0·74	0·90	0·676

At Exeter, on December 24th, 1821, at 10 p.m., the barometer stood at 28·27 inches, the minimum preceding that in London by nearly seven hours. On the 28th, when the barometer was at its lowest here, 28·13 inches, it did not sink below 28·24 inches in London, the minimum at Exeter occurring at 2 p.m., and in London at 10 p.m.

In 1824, on November 22nd, at 8 a.m., the reading of the barometer was 29·49 inches, and on the 23rd, at the same hour, 28·25. This remarkable fall in the barometer was attended by one of the most violent storms and floods on record: it came on at the time of springtide; the villages of Chisel and Fleet, in Dorsetshire, were swept away, and Sidmouth suffered severely.

The depression of the barometer on January 13th, 1843 (when the barometer fell 0·8 inch in 10 hours), was accompanied by a violent tempest from S. veering to W., with much thunder, lightning, and snow changing to rain; the crisis of the storm occurred in the morning about 7 a.m. The preceding evening was calm, clear, and frosty.

It has been shown in the above tables that the two periods of the year which are characterized by the highest condition of the barometer, February and March, and September, are immediately succeeded by periods which are characterized by its lowest conditions, April and October. Without laying much stress on these circumstances, it is yet worthy of remark, that the greatest amount of rain falls in the month of November; the least in July; and that in April, when a second minimum of pressure obtains, the fall of rain is greater than in the succeeding or two preceding months.

In considering the above indications of the barometer, without reference to other atmospherical phenomena, nothing very striking or peculiar presents itself, with the exception that its range is greater in winter than in summer, and that during the former period it is at its minimum, and at its maximum in

the latter. These conditions of the barometer, as the density of the atmosphere depends entirely on its temperature, may be accounted for by the relative temperature of this locality at these several seasons; hence, though the atmosphere should generally be much less dense in summer than in winter, the excess of pressure in the former period must be sought for in a variety of circumstances; among others, in the low temperature, at that season, of the British Isles, when compared with the continental temperature, and the large body of vapour then thrown into the atmosphere, which its higher summer temperature enables it to support.

The larger fluctuations of the barometer in winter over the summer, are due to the changes in temperature to which this district is subject, from the proximity of the cold continent to the comparatively warmer Atlantic.

If these observations be pursued further, it is found that all the great elevations of the column, which mark the presence of a dense atmosphere, appear in connection with northerly winds; while all its great depressions, the effect of a less dense atmosphere, occur in connexion with southerly winds. Hence, the barometer may be said not only to indicate the weight of the atmosphere, but the direction of its currents (*vide* Table 15).

The following very opposite states of the barometer are not only remarkable in themselves, but offer extreme illustrations of this position. On the 10th of January, 1825, the barometer stood at 30.98 inches, the wind blowing from the north; on the 23rd of November, 1824, the barometer stood at 28.25 inches, the wind blowing from the south-west; as also on December 28th, 1821 (previously referred to), when the

TABLE 15.—Average height of the barometer during the different winds.

	N.W.—W.	S.W.—S.	S.E.—E.	N.E.—N.
At Sea Level...	29.95	29.82	30.07	30.10

barometer stood at 28·13 inches. The northern atmosphere, from the coldness of its temperature, is relatively more dense, and contains but little aqueous vapour. As this air advances towards the south it becomes warmed, and acquiring thus a greater capacity for vapour, appears as a dry current. Nevertheless, being comparatively cold, it still retains its density—hence the connexion between the higher indications of the barometer with the northerly winds, as with the fine-settled state of the weather during their prevalency. Exactly the reverse of this is the case when the atmosphere proceeds from the south. The air being warmer, less dense, and containing a larger quantity of vapour than then belongs to that of this district on invading it, becomes cooled, its density increased, and capacity for moisture diminished: the result is, that with a falling barometer the vapour is deposited in the form of mist or rain.

DEW-POINT.—From daily observations made by Daniel's hygrometer, at 9 a.m., for nineteen years (*vide* Table 16, p. 32), the mean temperature at which dew is deposited is forty-five degrees ($45^{\circ}1$), the temperature of the atmosphere at the same time being fifty degrees and a half ($50^{\circ}6$); so that the difference or mean dryness of the air is five degrees and a half ($5^{\circ}6$), varying from a mean maximum of seven and a half ($7^{\circ}7$), to a mean minimum of two and a half degrees ($2^{\circ}7$).

The dryness of the atmosphere gradually increases from its minimum, in January, to July, when the maximum is attained: from this time it gradually decreases; hence, the autumn and winter seasons are the most damp, the difference of temperature between the air and that of the dew-point amounting to but a little more than three degrees ($3^{\circ}3$). The spring and summer are comparatively dry seasons, and maintain a tolerably uniform range of the dew-point—the mean difference of its temperature, and that of the air, being nearly eight degrees—in spring, $7^{\circ}7$; in summer, $7^{\circ}8$. This is due, as might be expected, from the warmed air acquiring an increased capacity for moisture. So also, after the higher temperature of

summer has subsided, the air becoming cooled, and its capacity for vapour diminished, its humidity sensibly increases. Hence, in September and October, there is a progressive tendency in the temperature of the dew-point to approximate to that of the air, until that more saturated condition of winter is attained, and which remains tolerably constant till March, when the temperature of the air, rapidly rising beyond that of the dew-point, regains the higher average of May and three following months.

As the amount of vapour contained in the air may be inferred from the temperature of the dew-point, so may it also, to a certain extent, afford some indication of the probability of its being deposited as rain. The dew-point, if it approximates to the temperature of the atmosphere, is for the most part accompanied by grey, misty, or showery weather; while a dew-point diverging

TABLE 16.—Average temperature of the dew-point and of the air, with the estimated elastic force of vapour and degree of humidity.

	Temperature of Dew-point	Temperature of Air.	Dryness.	Elastic force of vapour in inches of mercury.	Humidity complete Saturation = 1·000.
				Inches.	
January	36·6	39·2	2·6	·235	·918
February	37·7	40·6	2·8	·245	·907
March	37·6	42·6	4·9	·243	·834
April	42·0	48·4	6·4	·283	·799
May	47·4	55·7	8·2	·342	·755
June	52·4	61·0	8·6	·405	·748
July	54·4	63·1	8·7	·433	·746
August	54·1	62·4	8·2	·429	·761
September	50·9	57·4	6·4	·384	·800
October	46·3	50·5	4·1	·329	·839
November	42·1	44·9	2·7	·284	·907
December	39·1	42·0	2·9	·256	·904
Mean	45·1	50·6	5·6	·320	·804
Spring	37·3	40·6	3·3	·245	·800
Summer	47·3	55·0	7·7	·331	·760
Autumn	53·1	60·9	7·8	·420	·758
Winter	42·5	45·8	3·3	·290	·900

from the temperature of the atmosphere is, as a general rule, characterized by dry and fine weather.

The dew-point is found to be much influenced by the direction of the wind. With the south and south-westerly winds there is associated a high dew-point with a low amount of dryness; while a low dew-point with a large amount of dryness is associated with north and north-easterly winds.* In the latter case, the atmosphere, coming from the northern latitudes, contains relatively less aqueous vapour than it has a capacity for, when warmed by its arrival at this more southern district—hence, it becomes a dry or evaporating air. In the former case, the opposite conditions obtain: a warm air, saturated with aqueous vapour, arrives at a colder latitude, and, becoming cooled, loses its capacity for moisture, which is then deposited in cloud or rain. This, in its relation to variations of the barometer, has just been pointed out.

The dew-point, as an index to the amount of humidity in the air, becomes of so much importance, that various modes for ascertaining it have been devised. Besides the hygrometer of Daniel and others, another and more simple mode of observing the dew-point has been in recent years adopted—a comparison of the temperature of the air with that of the evaporation of water. Subjoined are the results (*vide* Table 18, p. 34) of ten years'

* TABLE 17.—*The mean monthly maximum dew-point, with corresponding observations.*

Dew-point.	Thermometer.	Dryness.	Prevailing Wind.	Weather.
53°6	56°1	2°5	S. and S. W.	Misty and showery.

The mean monthly minimum dew-point, with corresponding observations.

Dew-point.	Thermometer.	Dryness.	Prevailing Wind.	Weather.
37°2	44°9	7°6	N. N. E.	Fair.

TABLE 18. — *Temperature of the dry and wet bulb thermometers for each month in ten years, at 9 a.m.*

	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
1849	43.6	41.7	43.6	42.	45.0	42.6	48.2	44.4	57.7	53.2	62.3	57.	63.3	57.9	63.4	59.5	58.4	56.3	51.9	50.1	46.6	45.4	40.8	39.4
1850	36.2	34.9	46.9	45.2	41.5	39.4	51.5	49.2	54.1	50.6	62.7	58.	61.8	58.5	60.6	56.	57.7	54.1	48.8	45.8	48.6	47.	44.	42.9
1851	45.9	44.5	41.7	40.	44.9	42.7	48.9	45.7	55.5	50.9	63.	57.5	62.9	57.6	62.	58.3	58.3	54.3	54.7	51.9	40.4	38.3	43.2	41.5
1852	42.5	41.	41.8	39.1	42.3	39.5	49.5	45.3	54.1	51.2	57.9	54.7	67.7	62.2	63.1	59.6	57.8	55.1	49.4	47.7	49.2	48.3	47.9	46.4
1853	43.2	41.4	34.5	32.4	39.9	37.8	49.	46.3	54.9	50.9	60.8	56.8	62.1	58.3	61.9	58.2	57.9	55.2	52.6	51.4	43.8	42.5	37.4	35.5
1854	41.3	40.3	41.8	39.8	46.5	44.	52.9	47.7	55.9	50.9	58.5	54.3	62.4	58.8	63.4	59.2	62.5	57.8	52.2	50.	42.2	40.2	43.9	41.9
1855	37.3	35.5	31.9	30.3	41.8	39.4	48.4	44.5	51.7	47.8	58.9	55.1	64.4	60.7	64.8	60.3	58.9	56.9	52.7	51.3	42.5	40.9	40.6	39.3
1856	41.3	40.2	42.9	41.5	42.1	39.7	49.4	46.6	53.	45.5	62.6	54.5	63.8	59.4	67.5	62.2	58.2	53.7	53.7	52.6	44.6	43.1	42.3	41.1
1857	39.	37.7	40.5	39.6	43.	41.1	48.8	45.8	55.2	51.8	62.8	58.7	63.5	60.7	66.9	61.2	61.9	57.9	54.3	52.7	47.2	45.9	47.2	46.1
1858	40.1	39.	38.8	37.5	43.1	41.7	50.	48.5	54.8	51.5	64.6	59.5	62.6	58.6	63.5	59.1	61.4	59.	52.2	49.9	41.	39.6	43.	42.6
Mean	41.0	39.6	40.4	38.7	43.0	40.7	49.6	46.4	54.6	50.4	61.4	56.6	64.4	59.2	63.7	59.3	59.3	56.0	52.2	50.9	44.6	43.1	43.0	41.6

observations, with the deduced dew-point. From these it appears that, at 9 a.m., the mean annual temperature of the air is $51^{\circ}2$, and that of evaporation $48^{\circ}5$, so that there is a mean difference of temperature $2^{\circ}7$. From this we may infer, in accordance with the formula adopted by Glaisher,* that the mean annual dew-point is $45^{\circ}2$. This so nearly accords with the observed dew-point, as to be almost considered as identical, especially when it is borne in mind the observations were not made during the same series of years. Nearly the same uniformity is observed during the several months, thus tending to confirm, not only the accuracy of the observations, but their value towards determining the true mean of the district.

Besides the use of the wet bulb thermometer for determining the dew-point, there are grounds for concluding it to be a better instrument for estimating, as regards man, the sensible temperature of the air, than the dry bulb in common use; inasmuch as our bodies, presenting a surface notably affected by the evaporation of its fluids, appreciates the differences of the quality of the air as modified by the amount of vapour it contains: for example, the easterly winds of spring, from being relatively dry, are, though of the same temperature, to the sensation colder than other winds which, with a greater amount of humidity, blow at other seasons. It would appear that, in order fully and usefully to appreciate the conditions of the air as regards the human body, and for all the purposes of the notation of temperature, both thermometers should be used; but that the wet bulb thermometer is the one that more accurately indicates the temperature that is personally experienced.

The mean dew-point at 9 a.m. deduced from the dry and wet bulb thermometers.

Jan.	Feb.	Mar.	April	May.	June	July.	Aug.	Sep.	Oct.	Nov.	Dec.
36.8	36.5	37.8	42.9	46.2	54.6	55.1	55.6	53.4	48.4	41.2	39.8

* Hygrometrical Tables, by James Glaisher, Esq.

CLOUD.—The prevalence of cloud throughout this district is conspicuous; and though many days occur in which the sky may be clear, or nearly so, yet during the larger number of days cloudy skies prevail. The latter part of autumn and midwinter are the periods of grey, dark skies, spring and summer being the time when the sky is clearest. Of the several months, December and January present about the same average of cloud; the skies from February become gradually clearer till September, which is the brightest of all the months, is attained: they then rapidly become overcast, and this continues to be their more general character till mid-winter is past. Though this order nearly corresponds with the indications of the dew-point, as noted in a previous page (p. 32), yet, as the observations have not been made at corresponding periods, too much stress must not be laid upon the coincidence.

The relative prevalence of sunshine, gleam, and cloud, is a point of much interest, these several conditions of the atmosphere materially influencing the productiveness and agreeableness of a district.* During the year there are, on the average, a

* TABLE 19.—Average estimated daily amount of cloud, during each month for ten years—0—10.

	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1848.....	5·6	5·1	4·6	4·	2·	4·6	4·2	4·6	4·1	4·4	5·	6·
1849.....	6·5	6·	5·3	5·7	4·7	3·1	3·2	3·5	4·4	4·8	6·2	5·3
1850.....	6·4	4·4	3·6	4·2	3·8	3·	3·4	4·	3·6	4·3	5·7	5·3
1851.....	6·3	4·2	4·4	4·4	3·9	2·8	3·5	2·9	2·1	4·8	4·3	5·3
1852.....	5·	3·9	2·7	2·2	3·7	5·	2·4	3·7	3·8	4·1	6·7	7·6
1853.....	7·1	5·1	3·4	4·9	2·4	3·5	3·5	2·6	3·4	3·7	5·2	5·8
1854.....	6·9	4·2	3·	2·4	3·5	4·5	4·1	2·5	1·7	4·9	5·8	6·1
1855.....	4·7	4·8	4·9	3·6	4·4	4·2	3·7	3·3	2·8	5·3	5·3	4·8
1856.....	4·9	2·2	3·7	3·4	3·4	2·4	3·	3·5	3·	4·5	4·4	5·6
1857.....	4·4	3·5	4·	4·7	2·7	2·	3·7	1·4	2·3	4·4	4·2	4·7
Mean	5·5	4·3	3·9	3·9	3·4	3·5	3·4	3·2	3·1	4·5	5·2	5·5

Average estimated daily amount of cloud during the four seasons—0—10.

Winter.	Spring.	Summer	Autumn.
4·5	3·6	3·2	5·

hundred and seventy cloudy days, and there are a hundred and ninety-four in which the sun shines upon us, and in one hundred and sixteen of these brightly and cheerfully. April and May are the months of the brightest sunshine.

The mean temperature of the sun's rays during the several seasons of the year, as indicated by an ordinary thermometer suspended in the air four feet above the surface of the ground, has been stated in a previous page (p. 12). This, as was to be expected, is necessarily much influenced by the relative amount of cloud with which the sky is overcast; hence, during those months in which cloud prevails, a low aggregate of sun heat is observed. The autumn and the winter are the cloudy periods of the year: during these seasons the exposed thermometer registers, on an average, an excess of temperature of barely two degrees ($1^{\circ}9$) over that in the shade; while in spring and summer, when the skies are less cloudy, it amounts to nearly four degrees and a half ($4^{\circ}4$).

By bearing in mind these several conditions of the atmosphere, and which have so much to do in determining the healthy germination of seeds and ripening of fruits, explanation may be found in our cloudy autumns for some of those defi-

Average number of days for the year in which at 9 a.m. the sky is characterized by

Sunshine.	Gleam.	Cloud.
115.2	78.1	170.6

Average for each month in the year.

	Jan.	Feb.	Mar.	April	May	June	July.	Aug.	Sep.	Oct.	Nov.	Dec.
Sunshine	7.1	6.6	9.5	12.1	12.5	10.5	11.	10.6	11.5	9.6	6.5	7.6
Gleam	3.6	4.4	4.8	7.7	9.	8.1	8.6	10.1	8.1	6.	5.5	4.2
Cloud	20.2	17.2	16.6	10.1	9.5	11.2	11.3	10.2	11.	15.3	18.	19.1

cioneies experieneed in our distriet, which a mere statement of its mean temperature would not suggest. Though the vine fail generally so to ripen its grapes as to produce a profitable vintage, advantages, perhaps greater, are derived to our ever-green and luxuriant pastures.

MISTS AND FOGS.—These terms, in works on meteorology, are for the most part used indiscriminately. It may, however, be better to restrict the term “fog” to that opaque condition of the atmosphere which is unaccompanied by any deposition of a moisture on the surface of the ground, and “mist” when moisture is deposited.

Fogs are not of very frequent occurrence; now and then they take place during the summer season, but more usually in the autumn. They, for the most part, present the reddish-brown, or yellow colour, may have a sensible smell, and are always chilling and disagreeable to be inhaled. During their occurrence, the atmosphere is always still, or at most there is only a light breeze from a northerly, or some other relatively dry point of the compass. They are, probably, due to the descent, when the upper strata of the air are free from cloud, of a relatively colder stratum upon that existing in the locality: thus, fogs have occurred on light breezes from the north-west, succeeding to those from the south-west, or on those from the south-east to those from the north-west, or on those from the north-east to those from the north, or on south-easterly to the west, &c.; the former being winds invariably colder than those on which they impinge.

Mists, for the most part, are associated with a moving state of the atmosphere, the incoming air being warm and moist, and succeeding that which had been relatively colder, as a westerly wind succeeding to a north-easterly or north-westerly, or a south or south-westerly to south-easterly. Sometimes, however, mists are induced, and these are very wetting, by a colder wind blowing in upon a previously warmed air, as an easterly wind succeeding to one from the south-east, south, or south-west.

Upon the whole, this district is not peculiarly obnoxious to fogs and mists. The grey skies which prevail during the latter end of autumn and mid-winter do not present their characteristics: though the sun and all blue sky may be obscured, the surface distances are visible and clear.

RAIN.—The western shores of England are, from their posi-

TABLE 20.—*The fall of rain at the Devon and Exeter Institution, in Exeter, for each month and year, from 1817 to 1860, with the monthly mean fall, (155 feet above sea-level; gauge 13 feet 7 inches from the ground; diameter 1 foot).*

	Jan.	Feb.	Mar.	April	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
1817	3·38	1·00	1·34	·01	3·58	2·80	2·31	3·88	·48	·82	2·64	3·28	25·52
1818	2·94	2·24	4·76	5·10	1·20	·66	·94	·02	5·08	3·04	3·90	2·52	32·40
1819	4·72	3·22	·28	2·06	3·08	2·08	1·88	2·06	2·30	2·20	2·08	2·64	28·60
1820	2·68	1·22	·30	1·24	2·14	·52	·96	1·80	2·02	4·60	1·00	1·70	20·18
1821	2·16	·00	4·20	3·16	2·70	1·18	2·44	1·80	2·88	2·80	4·70	7·22	35·24
1822	·81	1·84	1·10	2·44	·40	·96	3·86	1·40	1·30	5·96	4·59	·68	25·34
1823	4·66	3·80	1·76	1·14	2·06	1·08	2·66	1·84	1·00	6·36	2·08	3·50	31·84
1824	·90	1·78	1·74	2·90	2·56	2·56	1·46	1·60	2·34	5·14	4·20	3·70	30·88
1825	1·96	1·64	2·64	1·82	2·36	1·22	·00	1·16	2·84	3·56	2·60	3·50	25·30
1826	1·80	3·66	2·64	·74	1·96	·46	1·34	3·58	5·06	2·16	1·80	3·08	28·28
1827	1·56	·46	4·34	1·48	2·44	·92	1·82	2·74	3·94	5·78	2·50	3·66	31·64
1828	4·70	3·24	·96	3·68	3·38	4·34	4·78	2·34	3·36	2·22	2·88	3·72	39·60
1829	1·78	1·44	1·96	5·06	·92	5·00	4·80	2·72	4·84	·96	·90	·36	30·74
1830	1·00	·50	·60	2·72	2·34	3·44	1·96	2·86	3·14	·16	4·80	3·90	27·42
1831	2·82	2·82	1·92	2·50	1·40	·92	2·30	1·88	1·60	4·66	2·66	5·30	30·78
1832	1·10	·60	2·00	1·34	1·36	2·02	1·50	4·66	·40	3·70	5·08	3·00	26·76
1833	1·80	6·86	1·84	2·34	·32	5·04	·68	·50	1·74	2·70	2·76	4·04	30·62
1834	5·98	1·46	·72	·96	1·02	2·60	2·54	2·04	1·64	·86	1·76	·76	22·34
1835	1·46	2·62	2·30	·84	1·84	1·30	·72	2·26	3·50	5·80	4·60	·96	28·20
1836	2·78	1·50	3·70	2·30	·90	1·66	1·86	·56	3·00	4·10	5·64	2·50	30·50
1837	1·84	3·34	1·04	1·60	1·04	1·24	1·80	3·80	2·62	1·48	1·96	1·94	23·70
1838	1·24	4·32	2·38	1·26	2·68	3·44	1·02	1·30	1·72	2·66	9·20	1·82	33·04
1839	1·44	1·30	1·78	1·94	1·04	5·64	3·94	1·38	3·84	4·22	4·82	4·50	35·84
1840	4·54	3·32	·00	·40	1·48	·48	1·40	1·14	1·60	2·04	6·10	·26	22·76
1841	2·48	2·10	2·60	1·92	2·50	2·40	2·04	2·18	6·08	3·64	4·78	3·74	36·46
1842	3·74	1·40	3·10	·48	1·30	1·06	1·42	3·58	2·16	1·44	6·58	1·44	27·70
1843	3·90	3·00	1·42	3·70	4·34	3·20	1·06	2·70	·54	5·10	3·98	·30	33·24
1844	2·94	2·40	2·96	·36	·00	1·76	1·03	2·74	1·40	2·62	3·42	2·16	23·79
1845	3·16	1·92	·28	·98	1·64	1·92	1·86	2·14	3·62	1·68	4·32	1·82	25·34
1846	3·30	1·34	1·74	3·40	3·14	·94	2·92	3·44	1·96	4·54	3·24	·84	30·80
1847	2·52	1·50	3·28	2·06	2·84	1·24	1·72	·74	·74	6·66	2·50	5·16	30·96
1848	1·94	3·66	3·88	4·32	1·24	3·30	1·24	3·16	4·10	2·98	1·45	5·40	36·80
1849	2·12	1·36	1·10	2·70	2·60	·60	2·20	1·04	3·10	2·10	2·16	4·54	25·62
1850	1·38	1·36	·44	4·40	2·04	2·20	1·92	1·96	3·58	2·60	3·04	2·40	27·32
1851	4·68	·74	4·68	1·94	1·28	1·10	2·58	1·74	·36	2·40	1·80	2·04	25·34
1852	5·30	·72	1·04	1·22	2·32	4·04	·52	5·77	3·40	4·70	·76	6·04	42·67
1853	2·74	2·96	1·38	2·12	2·00	2·94	1·88	2·10	2·06	3·52	2·38	2·28	28·36
1854	2·64	·56	·20	·08	2·12	1·94	3·34	1·04	·42	2·88	1·64	1·26	18·12
1855	·00	·19	·62	·24	2·46	3·58	3·50	1·08	·87	3·50	·72	2·16	18·92
1856	3·80	1·64	2·18	3·66	2·30	·84	1·04	2·86	2·52	2·24	·90	3·32	27·30
1857	2·20	2·21	3·64	4·28	2·10	1·90	1·28	·12	1·24	4·84	1·36	·58	25·75
1858	·22	1·26	1·56	3·70	1·52	1·92	2·22	·72	2·78	2·22	3·28	3·40	24·80
1859	1·64	2·22	1·28	2·90	1·12	1·68	1·00	3·56	3·32	4·54	4·28	3·00	30·54
1860	4·02	·90	3·00	1·32	3·42	6·48	1·72	3·32	1·56	1·12	3·96	5·26	36·08
Mean fall	2·60	1·99	1·79	2·15	1·97	2·19	1·94	2·18	2·45	3·25	3·36	2·88	28·97

The gauge at the Devon and Exeter Institution being placed about 14 feet from the surface of the ground, not entirely free from a suspicion of evaporation,

tion as regards the Atlantic, subject, relatively, to a large amount of rain, and common report speaks of that portion which is comprised in the southern district of Devonshire as peculiarly so. In order to investigate this point the rain-fall of Exeter will now be detailed. From daily observations recorded at the Devon and Exeter Institution (vide Table 20, p. 39), during forty-four years (1817 to 1860 inclusively), it appears that the average annual fall of rain is twenty-nine inches (28·97). This amount, however, is by no means constant, the quantity that falls in different years being very various. For instance, in one year (1852) there fell the very enormous amount of forty-two and a half inches (42·67), while in another (1854) it was only eighteen inches (18·12), a difference amounting to twenty-four and a-half inches (24·55).

with a holly-bush within three feet of it, induces Mr. Eaton (*Quarterly Journal of British Meteorological Society*) to consider that the above amount is somewhat deficient. A series of observations made by myself during the space of ten years at the Barnfield, only a short distance from the Institution, the gauge, five inches in diameter, three feet nine inches from the ground, and without other disturbing causes, shows a mean annual fall of twenty-nine inches and a-half (29·45), or half an inch in excess of that at the Institution. The following are the mean values of these observations for each month of the ten years :—

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
1848	2·11	4·26	3·07	3·73	1·36	3·33	1·85	2·71	4·34	2·64	1·45	5·30	36·15
1849	1·94	2·12	·61	2·54	2·72	0·66	2·44	1·16	3·40	2·76	1·86	3·98	26·19
1850	2·12	1·38	·60	4·57	2·10	2·31	1·71	2·03	4·33	2·13	3·13	2·46	28·87
1851	4·78	·40	4·66	2·17	1·35	1·27	2·70	1·66	·84	2·37	1·70	2·06	26·46
1852	5·99	·78	1·05	1·33	2·45	4·57	·63	5·78	3·66	4·64	8·00	6·24	45·12
1853	2·74	2·99	1·31	2·24	2·08	3·02	2·13	2·14	2·44	3·74	2·42	2·29	29·54
1854	3·38	·63	·26	·17	2·29	2·01	3·20	1·09	·51	2·87	1·71	1·36	19·48
1855	·07	2·04	2·03	·85	2·49	4·07	3·13	1·25	1·32	3·54	·80	2·27	23·86
1856	4·09	1·83	2·18	3·71	3·56	1·10	1·50	3·02	2·66	2·38	1·02	8·83	30·88
1857	2·58	2·42	3·97	4·50	2·46	2·17	1·42	0·23	1·03	5·25	1·39	0·62	28·04
Average	2·98	1·88	1·97	2·63	2·28	2·45	2·07	2·10	2·45	3·23	2·34	3·04	29·45

Mr. Eaton, however, taking 33·60 in. as the standard (being the mean annual value deduced from a long series of observations made in St. Thomas's, near Exeter), estimates, after adding 2·77 in., as a correction for elevation of the gauge, the true mean annual rain-fall at the Devon and Exeter Institution to be 31·43 in. He also estimates that of the Barnfield, adding 0·82 in., for height of gauge, to be 31·49 in. These two values are nearly identical, and may probably represent the true rain-fall of the district. Assuming such to be the case, to correct the average values of the Devon and Exeter Institution, about 8 per cent. should be added. The following is Mr. Eaton's table of corrections :

Devonshire, therefore, in common with the rest of England, has its exceptional seasons of flood-rains and of drought.* The number of years in which the quantity of rain is less than the average, scarcely exceeds that in which it is above—being in the proportion of twenty to twenty-four.

During the autumn season the largest quantity of rain, on the average, falls, namely, nine and a-half inches. In the remaining seasons the quantity is tolerably equally distributed, being rather more than an average of six inches for each season.

Comparison of the rain-fall at the Institution, Cathedral Yard, Exeter, 13 feet 7 inches above the ground, and at St. Thomas's Asylum, Exeter, 3 feet above the ground.

Month.	Average fall of rain from 1817 to 1860 inclusive.		Excess of rain at St. Thomas'	Ratio of the rain-fall in each month to the average monthly fall.		Higher ratio at St. Thomas
	Institution, 13 feet 7 inches above the ground, 155 feet above the sea.	St. Thomas's, 3 feet above the ground, 50 feet above the sea.		Institution	St. Thomas	
	Inches.	Inches.	Inches.			
January ...	2·604	3·195	+ 0·591	1079	1154	+ 75
February ...	1·991	2·528	·537	824	914	+ 90
March	1·970	2·333	·363	816	843	+ 27
April	2·155	2·447	·292	893	884	- 9
May	1·970	2·181	·211	816	788	- 28
June	2·196	2·350	·154	910	849	- 61
July	1·943	2·156	·213	805	779	- 26
August	2·189	2·240	·051	907	810	- 97
September	2·456	2·746	·290	1017	992	- 25
October	3·257	3·698	·441	1349	1336	- 13
November...	3·360	3·845	·485	1392	1389	- 3
December...	2·881	3·493	·612	1192	1262	+ 70
Total	28·972	33·212	4·240	—	—	—
Average ...	2·414	2·678	·354	1000	1000	00

* Mr. Eaton has given a useful table showing the probable variation in the amount of rain for three localities:—"The probable variation in the rain-fall is that difference from the mean within which it is an even chance that the amount will fall. If the deposit of rain in any year or month differ from the average more than this, it may be considered wet or dry, as the case may be: if the difference is less, the period is of ordinary character, as far as regards rain-fall."

As regards the months,* by far the larger proportion is deposited in October (3·26 inches), and November (3·36 inches). The rain-fall then gradually lessens through December, January, February, and March, till April, when there is an increase followed by a notable decrease in May. In June, the fall of rain again increases, to be followed by a considerable diminution in July, which is the driest of all the months in the year. After this month the rain-fall gradually increases, till the maximum of November is attained.

Showing the mean monthly fall of rain and probable variation at St. Thomas's, 50 feet above the sea; Broad Hembury, 300 feet; and Goodamoor, 600 feet above the sea.

	St. Thomas's, Exeter.		Broad Hembury.		Goodamoor.	
	Monthly fall.	Probable variation.	Monthly fall.	Probable variation.	Monthly fall.	Probable variation.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
January	3·18	1·05	3·07	·94	6·09	1·66
February	2·47	·92	2·48	·69	4·04	1·13
March	2·36	·92	2·07	·89	3·68	1·50
April	2·37	1·04	2·55	1·04	3·93	1·65
May	2·15	·73	2·41	·76	3·75	1·15
June	2·35	·99	2·99	1·09	4·11	1·76
July	2·18	·88	2·56	·74	3·78	·94
August	2·18	·82	2·93	·95	4·22	1·34
September	2·68	1·03	2·68	1·05	4·41	1·64
October	3·68	1·20	4·05	1·18	5·94	1·63
November	3·76	1·37	3·89	1·64	6·37	2·47
December	3·53	1·25	3·03	1·10	5·49	1·73
Year	32·89	3·83	34·71	4·64	55·81	6·48
Monthly fall	2·74	—	2·89	—	4·65	—

* TABLE 21.—Average amount of rain in the four quarters of the year.

Winter.	Spring.	Summer.	Autumn.
Inches. 6·56	Inches. 6·35	Inches. 6·59	Inches. 9·50

Average amount of rain in the several months.

Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Monthly Average.
Inches. 2·60	Inches. 1·99	Inches. 1·97	Inches. 2·15	Inches. 1·97	Inches. 2·20	Inches. 1·94	Inches. 2·19	Inches. 2·46	Inches. 3·26	Inches. 3·36	Inches. 2·88	Inches. 28·91

The autumn has just been stated to be the most rainy of the four quarters, *i. e.*, the season in which the largest amount of rain is deposited. It would also appear that the rain during this season falls heavier, and more continuously, than at other times, for the number of days in which this larger amount takes place is not very greatly in excess of those other seasons in which the amount is less. The extent or persistency of wet weather is not, therefore, to be estimated too exclusively by this standard alone. This may be rendered more obvious by comparing, in the several months,* the number of rainy or wet days (*i. e.*, a day on which a fall of rain, however slight, takes place), with the amount of rain deposited. Thus, in January and December, when the quantity of rain is relatively large (amounting to about three inches), the number of rainy days is, in the former, greater, showing that the comparative heaviness of the rain in December is far in excess of that in January. In September, though the fall of rain is not quite equal in amount to that in December, its comparative heaviness stands towards January in much the same relation as does that of December. We may, therefore, infer that in January, the rain, though as frequent as

* TABLE 22.—Average number of days in which rain falls in each month, with the amount of rain during the same period (1848-57).

	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Wet day	18·4	12·7	11·9	13·7	14·3	14·2	13·3	14·2	12·3	18·7	14·4	15·3	173·4
Rain	In. 2·98	In. 1·90	In. 1·97	In. 2·58	In. 2·29	In. 2·45	In. 2·07	In. 2·11	In. 2·45	In. 3·23	In. 2·35	In. 3·04	In. 29·34
Comparative } Heaviness }	·16	·15	·17	·19	·16	·17	·16	·15	·20	·18	17	·20	·17

Average number of days in which rain falls in each season.

	Winter.	Spring.	Summer.	Autumn.
Wet day	43·	42·2	39·8	48·4
Rain	Inches. 6·85	Inches. 7·32	Inches. 6·63	Inches. 8·62
Comparative } Heaviness }	·16	·17	·17	·19

in these two months, is comparatively lighter. In January and October, the average number of wet days is about equal, while in the latter month the rain is greatly in excess. The autumn rains are heavy; those of winter light and drizzling.

The average quantity of rain falling upon a wet day is about the sixth of an inch (0·17); occasionally, however, larger amounts of rain fall in short spaces of time, but still nothing to be compared to those enormous amounts which fall in some of the hill counties of England. Perhaps in the immediate district of Exeter there never occurred a fall of two inches in the twenty-four hours. The most remarkable rain of the whole period of forty-four years, was in November, 1836. During the days of the 26th, 27th, 28th, and 29th of this month, rather more than four inches (4·2) fell; of this 1·86 inch fell on the 28th, and 1·30 inch on the 29th.* This occurred upon a north-easterly wind dropping upon a south-easterly, with a temperature changing from sixty-four to fifty-three degrees. This fall of rain is more particularly exceptional from its continuance during a period of four days. Usually, on the occurrence of so large an amount for this district as an inch, or more than an inch, falling within the space of twenty-four hours, it is succeeded by a period, may be of another twenty-four hours, in which there are clear skies, with a cessation of the fall. The above recorded rain is otherwise interesting, as showing the rationale of the autumnal rains of this district. The south-easterly winds, with their high temperature, representing the warm atmosphere of the preceding season, are intruded on by

* In the hilly districts of the country much larger amounts occasionally fall. "The most remarkable was that which occurred at Huntsham Court on July 1, 1857, when between 3 and 7 p.m. *i. e.*, in four hours, 3·87 inches of rain fell. This is probably the heaviest fall in so short a space of time that has been recorded in the south of England. At Holne, in January, 1851, 4·17 inches fell on the 20th, and in November, 1852, 3·91 inches fell during the night of the 6th. In the low country, at Clyst-Hydon, there fell of rain, in 29 hours, on the 6th and 7th of October, 1847, 3·04 inches; three days afterwards there was an additional fall of 1·06 inch. Again, on July 10th, 1854, during a severe thunder storm, there fell 1·42 inch in 1h. 20m."—*Mr. Eaton's paper in Quarterly Journal of British Meteorological Society.*

those cold north-easterly winds which herald winter. These chill the warmer atmosphere they impinge upon, and, destroying its relatively larger capacity for vapour, the vapour it contains is then deposited as rain.

In a previous page (p. 33), it has been shown that the barometer is at its highest, and the dew-point at its lowest, during the north and north-easterly winds; while during the south and south-westerly winds the barometer is at its lowest, and the dew-point at its highest. We may, therefore, infer that the dry winds are those ranging from the south backwards to the north, including the east and its variations; while those that are attended by rain and moisture blow from the south forwards to the north, including the west and its variations. The greater prevalence of those latter winds somewhat accounts for the larger proportion of rain that falls at this season.

During the winter season, the south-west wind is often accompanied by a misty rain or a slight drizzle, whilst the temperature of the air is at the same time warm, the atmosphere is thus rendered soft and relaxing. From its prevalence this is not inaptly styled "Devonshire weather." Though it is more than probable the cause of the deposit of rain has often a very near origin, depending on the collision of local currents of air of different temperatures, and these of no very wide extent, yet we may fairly infer that this misty rain has a more distant and extended source; that the south-westerly wind that brings it has acquired, relatively, not only a larger capacity for, but is saturated with, vapour from having traversed the Atlantic, where it has been warmed by the higher temperature of the equatorial latitudes, and by that remarkable body of water, the Gulf-stream. This air, thus heated, and containing vapour to saturation, deposits it in a misty moisture when cooled by the lower temperature of the local climate.

The prevalence of westerly and south-westerly winds in autumn, accounts for its being chiefly continued rain which falls during this season; while in the spring and other seasons, when

the winds are for the most part from the north and north-east, such rain as falls is almost entirely deposited in showers, and these showers are of only short duration. The explanation of this probably is, that a warm air saturated with vapour is impinged on by strata which are colder and drier. These latter, first chilling the warmer air, induce a copious and showery rain deposit, until their own drier air becomes established as the atmosphere of the district. The north and north-easterly winds, being dry winds, do not "bring up" the rain, but from the lowness of their temperature act upon the humid local climate, and make it deposit its relatively large amount of vapour; hence these winds only cause rain when they are colder than the atmosphere of the local climate. The rains caused by them, as just said, are often heavy, but rarely persist beyond a few hours. The west and the south-west winds being warm and relatively moist, bring up a large amount of vapour, and impinging on the atmosphere of this colder latitude, deposit it as rain. These inferences are fully borne out by a series of interesting

TABLE 23.—*Average general character of the day for each month and season of the year.—All sunshine constitutes a fine day; alternate cloud and sunshine, without rain a fair day; and alternate cloud and sunshine, with rain, a showery day. The fine, fair, and cloudy days are dry days; the showery and rainy days are wet days.*

	Fine.	Fair.	Cloudy.	Showery	Wet.	Total Dry days	Total Wet days
January	6.1	4.6	7.5	3.9	8.8	18.2	12.7
February.....	8.	4.5	3.1	4.5	8.1	15.6	12.6
March.....	9.2	5.9	3.6	6.	6.2	18.7	12.2
April	12.9	2.6	1.	7.5	6.	16.5	13.5
May.....	18.2	4.	1.5	4.6	2.6	23.7	7.2
June.....	13.	3.5	0.8	6.7	5.9	17.3	12.6
July.....	15.9	3.6	0.7	7.1	3.6	20.2	10.7
August.....	15.2	3.5	0.3	6.7	5.1	19.	11.8
September	11.3	4.1	0.6	8.5	5.3	16.	13.8
October	8.1	5.6	2.7	5.7	7.7	17.4	13.4
November	6.6	4.	4.9	4.6	10.	15.5	14.6
December	7.9	5.1	4.9	4.	9.	17.9	13.
Winter	23.3	15.	14.2	14.4	23.1	52.5	37.5
Spring	44.1	10.1	3.3	18.8	14.5	57.5	33.3
Summer	42.4	11.2	1.6	22.3	14.	55.2	36.3
Autumn	22.6	14.7	13.5	14.3	27.6	50.8	41.
Annual average.....	132.4	51.	32.6	69.8	78.3	216.	148.3

observations (*vide* Table 23, p. 46), made by Dr. Barham, on the character of each day. From these, it will be observed, that from March to September, the rain falls chiefly in showers, from October to February, more continuously.

During the spring and fall of the year, it frequently occurs, before the climate of the coming season is established, that the weather is intermitting; rainy and dry days alternating with each other, and with remarkable regularity. The warm stratum of air, being impinged on by the one that is colder, yields up its vapour, and then these strata, thus mingling together, make, for a time, a uniform local atmosphere—humid it may be, but not rain inducing. So things continue till, on a fresh ingress of air of a differing temperature, this uniformity is again disturbed, and the deposit of rain is renewed. This alternation of dry and wet days not only often occurs in April and May, when the south-east and south-west winds impinge on those from the east, but frequently continues till the south winds become established. Again, in October and November, when the west and north-west winds impinge on the east and north-east, the same tendency to alternate fair and wet days is observable. On the former occasions, *i. e.*, when the south-east and south-west winds impinge on the east wind, there is, occasionally, a whole day's rain—a circumstance, in this district, of singularly rare occurrence. On the latter occasions, the intermediate fair days have often a humid atmosphere—the relative amount of the vapour in the air being very considerable; but inasmuch as its temperature is in a state of uniformity, this is not deposited; for it must be borne in mind, that humidity of the air is not in itself the cause of rain.

When the varied surface of Devonshire is considered in connexion with its position towards the Atlantic, it may be concluded that the rain-fall in different parts of it would be very unequal; the more especially as that continuous ridge of hill country, stretching northward from the sea to Dartmoor, and, together with Dartmoor, forming the western boundary of the quadrilateral area of South Devon, presents an extended and

elevated barrier which tends to intercept at its cold summits much of the vapour borne inland with the south-western atmosphere. Mr. Eaton has collected a large amount of information, generally illustrative of this subject, from forty-eight different localities; and in an elaborate and very carefully written paper (*vide Quarterly Journal of the British Meteorological Society*), has reduced these observations to one standard, so that their comparison is both easy and satisfactory. For this standard a long series of observations made in the Parish of St. Thomas,*

* TABLE 24.—*Showing the mean monthly and annual rain-fall at St. Thomas's Hospital, Exeter. (50 feet above the sea-level. Gauge 3 feet from the ground, diameter 1 foot.)*

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
1814	3.54	.80	1.38	1.95	.10	2.76	1.30	.96	2.02	3.05	2.10	2.90	22.86
1815	2.30	2.30	3.92	.70	3.60	2.60	.95	.70	1.85	5.24	1.90	2.20	28.26
1816	3.34	1.95	2.81	1.00	1.33	1.67	5.86	2.30	1.23	1.82	3.39	7.34	33.59
1817	4.42	1.23	1.98	.00	3.67	2.66	2.22	4.59	.44	1.12	2.79	4.13	29.25
1818	3.60	3.94	5.78	6.33	1.56	.76	.80	.07	6.78	2.40	4.16	3.12	39.30
1819	5.40	4.27	.27	2.42	3.65	2.25	2.40	2.20	2.64	2.31	2.74	4.35	34.80
1820	3.68	1.38	.62	1.44	2.23	.57	1.05	2.17	2.42	5.68	1.62	2.49	25.35
1821	2.83	.32	4.49	3.43	3.06	1.96	2.68	2.33	3.10	3.36	5.44	8.58	41.58
1822	1.28	2.51	1.62	2.89	.57	.87	3.71	1.53	1.33	6.31	5.87	1.10	29.49
1823	5.80	(4.61)	2.17	1.38	2.28	1.71	2.82	2.16	1.10	7.17	1.91	4.68	37.79
1824	.90	2.06	2.83	3.44	2.65	2.63	1.49	1.57	2.30	5.65	5.28	4.66	35.46
1825	2.50	2.15	2.98	2.15	2.53	1.18	.00	1.29	2.79	4.03	2.85	4.27	28.72
1826	2.30	4.23	2.67	.88	1.99	.35	1.08	2.50	5.29	3.40	2.36	3.48	30.53
1827	1.97	1.14	4.07	1.68	2.92	1.11	1.47	2.29	4.15	6.02	2.37	4.04	33.23
1828	5.41	3.30	1.25	3.81	3.27	3.63	4.50	2.59	3.42	2.21	3.09	3.93	40.41
1829	2.02	1.64	2.46	5.92	.79	4.58	5.61	2.69	5.43	1.21	1.03	.71	34.09
1830	2.14	.92	.83	2.93	2.56	3.61	2.26	3.07	3.29	.50	5.55	5.05	32.71
1831	3.11	3.12	2.33	2.95	1.49	.95	2.17	1.80	2.17	5.52	3.49	5.78	34.88
1832	1.31	.84	2.62	1.20	1.81	2.32	1.54	5.10	.38	4.00	5.72	3.37	30.21
1833	2.01	7.81	1.76	3.44	.62	5.11	.77	.60	1.98	3.34	3.15	4.66	35.25
1834	7.08	1.70	.81	.97	1.23	2.95	3.30	2.13	1.96	1.25	2.23	1.04	26.65
1835	1.73	8.23	3.24	1.17	2.55	1.78	.59	2.08	4.02	5.78	4.48	.93	31.58
1836	3.47	1.65	4.90	2.74	1.17	1.98	2.08	.74	3.49	4.24	6.55	3.17	36.18
1837	2.18	4.07	1.36	1.61	1.20	1.47	2.15	4.19	2.87	1.70	2.50	2.33	27.63
1838	1.66	5.39	2.64	1.61	2.89	4.01	1.35	1.35	1.57	3.58	10.26	2.18	38.99
1839	2.18	1.71	2.72	1.78	1.25	5.39	4.51	2.02	4.16	4.81	5.44	5.12	41.09
1840	4.97	3.85	.06	.40	1.60	.78	1.58	1.29	1.93	2.16	6.61	.78	26.01
1841	3.93	2.76	3.25	2.24	2.80	2.38	2.07	2.52	6.21	4.08	6.46	4.20	42.90
1842	4.29	2.29	3.18	.54	1.44	1.27	1.45	3.78	2.23	1.58	7.63	1.71	31.39
1843	4.50	3.80	1.55	4.46	4.77	3.01	1.37	2.90	1.28	5.94	3.92	.82	38.32
1844	2.77	2.92	3.15	.37	.10	1.53	1.37	3.08	1.54	3.33	3.83	3.63	27.62
1845	3.62	2.03	.45	1.04	1.64	2.29	1.73	2.38	4.23	2.10	4.63	3.02	29.16
1846	3.59	1.79	2.55	4.31	3.27	1.16	5.10	2.24	1.94	5.33	3.51	1.15	35.94
1847	3.14	1.90	3.54	2.51	2.17	1.53	1.42	.97	.48	7.50	2.98	5.50	33.59
1848	2.82	4.47	3.35	4.92	1.17	3.29	1.68	3.74	4.56	3.18	1.55	6.04	40.77
1849	2.21	1.49	.99	2.58	2.60	.81	2.62	.87	3.42	2.54	2.54	4.09	26.76
1850	2.40	1.55	.74	4.11	2.29	2.60	2.00	2.31	4.74	1.93	3.23	2.87	30.82
1851	5.84	.63	5.00	2.20	1.43	1.09	2.07	1.87	.80	2.66	2.28	2.38	28.25
1852	6.67	.80	1.18	1.36	2.49	4.25	.52	6.29	3.24	4.91	8.53	6.93	47.17
1853	2.84	2.95	1.54	2.46	2.41	2.74	2.19	2.23	1.83	4.39	2.70	2.21	30.49
1854	3.03	.66	.34	.22	2.24	2.49	3.62	1.34	.45	8.33	1.74	2.84	22.30
1855	.00	2.40	2.42	.53	2.74	3.87	4.14	1.35	1.03	3.59	.89	2.80	25.26
1856	4.95	2.69	2.42	3.43	3.13	.99	1.60	2.40	3.66	2.69	.30	5.13	33.29
1857	2.30	2.46	4.48	3.97	3.29	2.06	1.33	.45	1.76	6.17	1.46	.93	30.66
1858	.45	2.83	1.00	5.20	.63	1.52	3.17	.70	2.92	2.49	4.14	3.97	29.02
1859	2.15	2.48	1.66	3.42	1.32	2.39	1.39	2.03	3.72	5.58	4.75	3.39	34.28
1860	5.11	1.36	3.48	1.25	4.57	8.04	1.90	2.20	1.78	1.61	4.68	6.13	42.17
Mean.	3.186	2.474	2.357	2.368	2.148	2.350	2.181	2.181	2.680	3.678	3.757	3.535	32.856

to the westward of the city of Exeter, has been selected. These forty-eight stations* have been grouped together, so as conveniently to illustrate the relative mean annual rain-fall incidental to each locality; the following are the results:—

	Inches.
Hills in the North-east	43·55
Vales and Lowlands in the East	34·06
South-east Coast	33·82
South Coast	36·89
East Dartmoor	74·31
West Dartmoor	58·43
Hills west of the Dartmoor range	44·96
Exmoor	61·85
North-west Coast	35·72
Central Devon	40·46

It will be seen from the above, that the average amount of rain annually deposited in the south-eastern division of the county is less than in any other district, and that the coast generally is not so obnoxious to heavy rain as the high lands towards its centre. In the hill district, particularly represented by the

* *Mean observed average annual rain-fall in the forty-eight undermentioned places in Devon, with the concluded rain-fall reduced to the St. Thomas' series, allowance being made for elevation, height of gauge, disturbing causes and errors.*

	Mean observed rain-fall.	Concluded mean annual rain-fall.		Mean observed rain-fall.	Concluded mean annual rain-fall.
	Inches.	Inches		Inches.	Inches
1. Huntsham Court, Bampton	53·69	46·63	25. Sheep's Tor, Burrator	48·83	54·32
2. Tiverton, Hayne	38·17	40·52	26. Prince Town	58·55	55·87
3. Otterhead	42·05	43·49	27. Dartmoor Prison	47·58	62·82
4. Honiton	33·20	32·23	28. Rough Tor Consols	61·03	59·83
5. Broadhembury	34·71	35·10	29. Tor Hill, Ivy Bridge	47·33	44·32
6. Clyst Hydon	32·52	33·18	30. Ridgeway Hill, Plympton	47·36	45·76
7. Sidmouth	27·91	34·00	31. Saltram	42·17	39·97
8. Sidmouth	51·03	35·59	32. Devonport	33·55	40·85
9. Exeter, St. Thomas' Hospital	32·89	33·60	33. Plymouth	35·70	40·48
10. Exeter, Institution	28·97	31·43	34. St. Budeaux, Ham.	46·42	46·10
11. Exeter, Barnfield	29·41	31·49	35. Buckland Monachorum	50·64	49·07
12. Exeter, High Street	30·52	40·30	36. Tavistock Library	37·44	48·47
13. Exeter, Pen Leonard	33·84	33·67	37. South Sydenham	47·36	53·70
14. Mamhead	42·35	35·89	38. Edgecumbe	54·29	46·72
15. Dawlish	37·11	31·93	39. Bradstone	34·13	39·14
16. Teignmouth	40·35	31·47	40. Westland Pound, Kentisbury	46·88	61·85
17. Teignmouth	25·30	27·49	41. Appledora, Taw Lighthouse	24·24	36·74
18. Torquay	40·42	34·75	42. Brauntou	31·79	35·70
19. Highwick	35·40	35·97	43. Barnstaple	41·00	42·62
20. Bovey Tracey	43·74	39·26	44. Barnstaple	41·00	39·61
21. The Gnull, Kingsbridge	33·18	36·89	45. South Molton, Castle Hill	41·20	41·29
22. Holne Vicarage	69·81	74·31	46. Chawlcigh	37·73	39·63
23. Goodamoor	55·81	56·21	47. Witheridge	31·08	40·47
24. Lee Moor, Shaugh	—	60·83	48. North Tawton	31·88	38·12

slopes of Dartmoor, the mean annual amount is much more than double that proper to Exeter and its contiguous sea-board. It is the fall of this, as regards locality, exceptional amount of rain that has induced the erroneous impression, that the south of Devon is subject to a rain-fall very much in excess of that of other parts of the south coast of England.

SNOW.—A fall of snow is not of frequent occurrence, and when it does occur, rarely falls in any great quantity, or remains upon the ground above two or three days, excepting on the high lands of the district. These highlands are sometimes covered, perhaps for weeks during the winter season, with a snow so light and scattered as to be scarcely appreciable, yet viewed from a distance giving the impression of a snow-clad country. On some rare occasions, however, the depth of a fall of snow may be to the extent of inches, reaching towards half a foot, with high drifts in certain places. The remarkable snow-storm of January, 1814,* for the depth of its drifts and its continuance unthawed upon the ground, stands out as exceptional in the history of the county.

* "CHRISTMAS WEATHER IN DEVONSHIRE IN JANUARY, 1814.

"The snow, which began to fall in this neighbourhood in the evening of Monday, the 10th instant, and continued falling till the afternoon of the following day, is believed by our aged neighbours to have formed a heavier mass than has fallen in this quarter, within the same space of time, since the hard winter of 1777-8. Intelligent observers of natural phenomena estimate it at the depth of sixteen inches; but, as it was borne along by a strong gale of wind, it drifted into heaps, in some places, of incredible magnitude; and, acquiring cohesion by freezing as it fell, it wreathed itself, from trees and house-tops, in pendant forms of infinite variety and beauty. Throughout Tuesday the greater part of our shops were shut up, and some of our streets rendered almost impassable; while the roads diverging from Exeter were in many parts absolutely blocked up. The London mails throughout the week have lost from twelve to eighteen hours each of their usual time, owing chiefly to the great accumulation of snow at a place called Longbury (or Long Bredy) Hut, near Bridport, in Dorset, where the coaches have been stopped, and the bags sent forward on horses. The snow appears to have declined as it advanced to the northward. The Bath mail coach has kept to within an hour or two of its time throughout the week. The mails from the North of Devon have lost time on an average of about twelve hours per day. The mail direct from Exeter through Launceston, for Falmouth, which started last Tuesday morning, was stopped (we understand) somewhere about Launceston, Five-lanes, or the Jamaica Inn; and up to yesterday afternoon there had been no exchange of letters by that line of road. About three o'clock, the Falmouth mails arrived here on horses, having

In ten years (1825 to 1834 inclusive) the number of days in which snow or sleet fell amounted to sixty-nine, and these were chiefly during the months of January and February. Occasionally in the early days of March the fall is comparatively heavy. During the fall the wind is generally from the north-east, the temperature being only slightly below the freezing point.

TABLE 25.—*The average number of days in which snow falls in each year, with corresponding observations.*

Yearly average.	Thermometer.	Wind.			
		N—E.	E—S.	S—W.	W—N.
6·9	31°·8	3·1	1·7	·5	1·9

Sixty-nine days of snow in ten years were thus distributed in the several months.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Sixty-nine days' snow..... }	30	15	5	6	1	0	0	0	0	1	5	6

been brought from Bodmin to Launceston on men's shoulders. Neither has there been any passing over Dartmoor to Princetown. The heights of Haldon (five miles from Exeter on the Plymouth road) were also impassable. Two fish-carts, caught there on Tuesday, were abandoned, their drivers glad to get off with their horses. Coaches and chaises which attempted that road, from Exeter, were compelled to return. The mails sent hence on Friday last, on three horses, for Plymouth, were forced back again. On Saturday, the accumulated mails for Plymouth, and for Cornwall via Plymouth, were sent from Foote's Hotel on eight horses, and succeeded in crossing Haldon;—fifteen or sixteen horses came in here on the same day, with mails from Plymouth. On Friday there was another pretty sharp shower of snow; but on Saturday it thawed, and continued to do so until yesterday morning, when it froze again. This partial reduction of the snow encouraged the stage coaches to start again, and some of them went out provided with spades to work their way through. Our letters by yesterday's mail from Cornwall speak of little else than the effects of the weather. At Five-lanes, eight miles west of Launceston, there was a cluster of coaches, chaises, carts, waggons, &c., stopped by an impassable barrier of snow. At Launceston, winter birds came so thick to market on Saturday last, that woodcocks sold at 1s. each; snipes at 18d. a dozen; ducks, widgeon, &c., in proportion; but the thaw setting in, they soon rose 100 per cent. We have only heard of one life lost in the snow—a private of the East Devon Militia, coming to Exeter on furlough, was found up to the chin on Haldon, frozen to death; he had about £15 in his pockets. The rumour that three of the Renfrew Militia had been lost in the snow is not correct.”—*Exeter Paper of Jan. 14, 1814.*

HAIL.—Hail occurs somewhat more frequently than snow. In ten years the number of days in which it fell amounted to seventy-one.* It is most prevalent in April and December. During a hail-storm the barometer is rather lower than when snow falls with a slightly higher temperature ($2^{\circ}4$). These storms usually proceed from the north or south of west, and it is worthy of remark that a change of wind almost always attends a hail-storm. Before the fall of hail, the wind is generally from the south-east, and immediately succeeding it from the south or north-west; the former relatively is a cold wind, while the two latter are warm winds.

THUNDER and LIGHTNING are comparatively unfrequent, and only very rarely are the storms attended by serious or awful consequences. In ten years the number of days in which storms of thunder and lightning occurred, amounted to a hundred and five,† taking place for the most part during the

* TABLE 26. —*The average number of days in each year in which hail-storms occur, with corresponding observations.*

	Annual Average.	Thermometer.	Wind.			
			N—E.	E—S.	S—W.	W—N.
Hail.	7·1	34°·2	·5	·3	1·7	4·6

Seventy-one days of hail in ten years were thus distributed in the several months.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Hail 71 days ...	9	9	7	16	3	1	0	0	2	4	5	16

† TABLE 27. —*The average number of days in which storms of thunder and lightning occur in each year, with corresponding observations.*

	Yearly Average.	Therm.	N—E.	E—S.	S—W.	W—N.
Thunder and Lightning	10·5	57·1	·7	4·2	3·8	1·8

One hundred and five storms of thunder and lightning in ten years were thus distributed in the several months.

Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
4	2	4	5	13	16	15	16	10	7	3	10

summer months; nevertheless, their greater prevalence then does not appear to be altogether owing to the higher temperature of this season, for more storms take place during the cold month of December than in the months immediately preceding and succeeding it. The barometer during a thunder-storm, stands rather lower than its usual average; the thermometer marks a high temperature, about six degrees above the mean of the climate, and the wind is usually from the south-east or south-west.

The thunder-storms in this district, though not usually, are occasionally, attended by awful results. Amongst some of these, the following may be specified. On the 10th of June, 1826, a thunder-storm vented its fury at Alphington. The tower of the church was struck by the electric fluid, and a boy, then at work upon it, killed on the spot. On the 19th of August, 1852, a storm broke over the marshes three miles below Exeter. The lightning struck the double Lock-house there, and of two young men, who had sought its shelter, one was killed; the other received the shock with only temporary inconvenience, though the electric fluid destroyed the works of his watch, traversed the gold guard chain attached to it, fusing many of the links, so that in different parts of the chain they were melted together; the contiguous linen of his shirt was singed, &c. It is probable from the course the electric fluid took, this young man escaped personal injury from having in his hand a gun: this served as a conductor to the electric fluid, which thus passed off to the wires of some bells near him. In 1854, at Heavitree, on the 24th of July, many sheep were killed; and on the 26th, some men taking shelter under a tree, one of them was killed. He was described as having been at the moment he was struck by the lightning jerked upwards and away from the tree.

The average number of days in which thunder and lightning occur in each of the four seasons.

Winter.	Spring.	Summer.	Autumn.	Average.
1·0	3·4	4·1	2·0	2·6

OZONE.—The development of ozone has been noted during so short duration of time and at such separate localities, that little else than a few general observations can be advanced in reference to it. Nor, as far as I am aware, have there been any corresponding observations on the electrical condition of the air, which from the agency of electricity in converting oxygen into this, its allotropic state, would appear to be necessary to make the elucidation of the subject satisfactory. From observations taken at three different localities during six years,* the average daily amount is 3·8, being slightly greater during the summer than the winter months, and more during the night season than in the daytime. Perhaps the only features of any certainty to be noted are, that in the city the amount developed is at its minimum; that distance from the city increases the amount; and that recent observations on the high ground in the neighbourhood (the Pennsylvania hill) show not only an increase but a full development to be almost constant.

The climate of the South of Devon, so far as averages deduced from the arithmetical mean of an extensive series of direct observations will permit, having been now set forth, it will be seen, in accordance with the general impression, that its chief characteristics are those of being soft, warm, mild, calm, equable, and free from storms; moreover, it is essentially oceanic, as was to be expected from its latitude and position as regards the Atlantic. Warm winds reach it from many points of the compass, either directly from the sea or only after passing over short distances overland. Though it may be subject to rather a large average amount of rain, it seldom occurs that a whole day is so unceasingly wet as not

* TABLE 28.—*The average amount of ozone in each month, 0—10—(from three years' observations in the Barnfield, one and a-half at Elmbrook, and one and a-half at St. Leonard's).*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean.
Ozone.....	3·6	3·3	3·7	3·4	4·0	5·5	4·6	4·3	3·4	3·5	3·0	3·4	3·8
In each } Quarter }	3·5			4·3			4·1			3·3			

to afford some few hours, either early or late, sufficiently fine for out-door exercise. During the winter season the temperature is rarely maintained for any length of time at a degree so low as to render the climate particularly inclement—frost only occasionally occurring, and then not for any long continuance. The air, though very often humid, from the general prevalence of warm westerly winds, is neither cold nor raw. It is during the prevalence of these winds there occurs that condition of the atmosphere which is understood by the expressive word “muggy;” the air being warm, moist, and still, with a grey sky. Doubtless this weather is relaxing, and, according to the popular notion, unhealthy. Such does not, however, appear to be the case, as will be seen in the sequel,—in fact, though the air is saturated with vapour, the accompanying temperature takes from it the usual injuriousness of a moist cold climate. During the winter months, the air coming from the sea is generally warmer than that which reaches this district from the land side, and as these sea winds then chiefly prevail, they may be considered one of the chief sources of the mildness of the local climate, while much of the vapour brought by them, being condensed on coming in contact with the land, particularly the higher parts, cloud and rain are the result. Clouds formed in this way are often to be seen over the land when none are to be seen seaward. These, if occurring in large amount, tend to prevent terrestrial radiation, so that at this season, when but little heat is derived from the sun, the cold is diminished; and as they are only dissipated in the formation of a light misty rain, are the cause of many “wet” hours—perhaps more than is usual for the amount of rain in some inland places. Though this mild grey weather may be the general character of the Devonshire winter, yet it is sometimes subject to a temperature so sufficiently low as to be severe. These occasional depressions of temperature are especially to be noted, and their effects weighed and appreciated. They are often the cause of much acute and fatal disease, which, there can be no doubt, might, to a great extent, were only due caution observed, be avoided. Lulled by the mildness of successive winters, or the general character of the

climate, the inhabitants are apt to submit themselves to undue exposure and a carelessness of clothing—and with the poor this is aggravated by a general improvidence—so that material provision is not made against the effects and consequent distress of severe weather; hence, whenever the winter temperature suddenly falls, or maintains itself for any unusual length of time considerably below the general average, a more than ordinary amount of privation, acute disease, and mortality is experienced.

The general mildness of the winter weather, which finds its estimation and description in suitable expression, often induces the casual visitor, on the occurrence of these occasional periods of cold, to consider the climate has been falsely represented;—not so, however, mildness is its essential characteristic—inelement cold the exception; and this exception not only occurs, but is to be expected, for it is the common lot of European climates, even the mildest of them, to have their seasons of severity.

The character of the early spring does not materially differ from the winter, excepting that the air is less damp, and the days less rainy. Towards the middle of this season, north-easterly winds prevail, and these are often piercing and cold, while the sun shining joyously, gives the general impression of a summer's warmth. As the spring advances, these winds are tempered by warm showers, and summer, with its genial heat, is ushered in. The summer is rarely very hot. The occasional clouds of this season, by obstructing its rays, serve to moderate its heats, so that vegetation is often green and luxuriant when parched elsewhere. Though showers are frequent, the air is dry. The winds, which for the most part, blow from the north-west, are cooling and refreshing. Take it altogether, it is a fine and agreeable season. The evenings and nights, however, are sometimes cold and damp, so that exposure at these times with only light summer clothing, is to be avoided. July and August are, perhaps, the only safe months in which out-door lounging during the evening can be safely indulged in. The autumn is warm and inclined to be damp and rainy; it is peculiarly the season of

a light drizzling rain, which is associated with an uniformly grey-elouded sky. The winds during this season are chiefly from the west.

In order further to appreeiate the eharacter of the climate of this distriet, it may be useful briefly to compare its summer and winter temperatures with those of some of the places which are situated within the same zone of mean temperature (*vide* note p. 5, *antea*). It will be seen, that in many of these the winters are colder, and the summers warmer. To partieularize a few—Vienna has a winter temperature, the average of which is colder by more than nine degrees and a half, and a summer temperature warmer by more than seven degrees; Mannheim, with a winter three degrees colder, and a summer five degrees hotter; Clermont and Brussels, together with other places, too many to mention, and which have a mean temperature scarcely superior to that of Exeter, are visited by far greater coldness in winter, and a heat much more considerable in summer. All these places are, therefore, obviously subject to much greater variations of temperature than this portion of Devonshire. Thus, while the difference between the mean summer and winter temperatures of the latter does not amount to less than twenty degrees, ($19^{\circ}2$) that of Clermont is nearly thirty ($29^{\circ}9$), and that of Brussels but very little less ($29^{\circ}5$).

This equability may be further illustrated by comparing it with the climate of those places, the winter temperature of which is the same as that of this distriet, and regarding how very much their mean annual temperature is in excess of that of South Devon.

If an isothermal line be drawn through South Devon, we should have presented to our notice such places as Nantes, with a mean annual temperature ($54^{\circ}6$) higher by four degrees, Bordeaux ($56^{\circ}4$) by five degrees and a half, St. Malo ($54^{\circ}1$) by three degrees and a half, Pau ($59^{\circ}4$) by more than four degrees.

To a less extent, the same is shown on comparing the climate

of this district with that of London.* As the comparison between these may not be uninteresting, it is given in detail.†

* *Vide Greenwich Observations. Philosophical Transactions, Part 2, 1850.*

† TABLE 29.—*Mean temperature of the months and year in London and Exeter.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean for the year.
London	35.7	35.2	40.9	45.7	52.6	58.0	61.3	60.5	56.3	49.3	42.4	38.8	48.3
Exeter.	39.8	41.3	43.3	47.9	54.5	59.8	62.6	61.8	57.4	51.5	45.7	42.2	50.7

Mean variation in temperature in successive months.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean monthly variation.
London	-3.1	+2.5	+2.7	+4.8	+6.9	+6.4	+3.3	-0.8	-4.2	-7.0	-6.9	-3.6	5.2
Exeter.	-2.4	+1.5	+2.0	+4.6	+6.6	+5.3	+2.8	-0.8	-4.4	-5.9	-5.8	-3.5	3.8

Difference of the mean Temperature of the warmest and coldest months.

London 25°.6.

Exeter 22°.8.

Mean temperature of the four seasons of the year.

	Winter.	Spring.	Summer.	Autumn.
London	38.3	52.1	59.4	43.4
Exeter	41.4	54.1	60.6	46.0

Mean variation in temperature in successive seasons.

	Winter.	Spring.	Summer.	Autumn.	Mean quarterly variation.
London	-5.1	+13.8	+7.3	-16.0	10.5
Exeter	-5.0	+12.7	+6.5	-14.2	9.8

Difference of mean temperature between the summer and winter seasons.

London 21°.1.

Exeter 19°.2.

The mean maximum daily temperature during each month.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
London	42.2	44.0	50.3	56.8	66.3	72.6	73.1	72.1	67.3	57.6	49.7	44.0
Exeter	44.5	46.2	49.4	55.3	62.5	67.9	70.7	69.7	64.6	57.6	50.9	46.7

Though the same relative law guides the temperature of these two localities during the several seasons, yet the variations in the London climate are more marked; hence the mean climate of this district is not only warmer by two degrees and a half ($2^{\circ}4$), but taking the several periods of the year, more equable, the variations between each succeeding month and each successive season, being generally less.

The mean temperature of these two localities, during the summer season, nearly approximates, while during the other seasons of the year, that of this district is somewhat higher—generally averaging more than three degrees; this average difference proceeding from a gradation in temperature remarkably regular, and common to both. On comparing the mean temperature of each month, we observe that in September the difference is scarcely more than one degree ($1^{\circ}1$); this increases till it arrives at the mean maximum difference in January, of four degrees ($4^{\circ}1$); and then gradually declines through the remaining months to approximate again in September—so that any divergence which takes place between the temperature of this locality and that of London, speaks to an equability of climate in this district over London.

The quantity of rain that falls annually in South Devon, is greater than in London by more than four inches ($4\cdot17$), neverthe-

The mean minimum daily temperature during each month.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
London	33 \cdot 1	33 \cdot 6	36 \cdot 3	39 \cdot 2	45 \cdot 7	49 \cdot 5	53 \cdot 2	53 \cdot 4	49 \cdot 4	43 \cdot 6	38 \cdot 6	34 \cdot 6
Exeter	35 \cdot 1	36 \cdot 2	37 \cdot 2	40 \cdot 5	46 \cdot 2	51 \cdot 8	54 \cdot 3	53 \cdot 9	50 \cdot 2	45 \cdot 4	40 \cdot 3	40 \cdot 3

Difference between the mean maximum and mean minimum temperature during each month.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
London	9 \cdot 1	10 \cdot 4	14 \cdot 0	17 \cdot 6	20 \cdot 6	23 \cdot 1	19 \cdot 9	18 \cdot 7	17 \cdot 9	14 \cdot 0	11 \cdot 1	9 \cdot 4
Exeter	9 \cdot 4	10 \cdot 0	12 \cdot 2	14 \cdot 8	16 \cdot 3	16 \cdot 1	16 \cdot 4	15 \cdot 8	14 \cdot 4	12 \cdot 2	10 \cdot 6	9 \cdot 4

less, the "wet" days, or the days in which this falls, are not so numerous.* The average annual number of wet days in Exeter, amounts to rather more than a hundred and sixty-two (162·4), while in London they amount to one hundred and seventy-eight.

As a general statement, it would appear that, as regards rain, the seasons in both localities are tolerably uniform. There is one exception: in London more rain, proportionately, falls during the spring and summer, while the larger amounts fall in South Devon in autumn and winter.

In the preceding pages, the climate of this district has been generally and particularly set forth. It might be possible to go into more minute detail, but the facts already adduced are sufficient for its illustration. They afford every proof of its mildness and comparative equability. As regards the British Isles, it may even be a question whether there be any portion, with the exception of that part of Cornwall comprised in the Land's End, which can vie with it in this respect.

TABLE 30.—Average amount of rain in each month in London and Exeter.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
London ..	2·15	1·50	1·35	1·60	2·05	1·65	2·60	2·70	2·20	2·95	2·40	1·40
Exeter ..	2·78	2·14	1·99	2·12	1·80	2·11	1·32	2·23	2·57	3·28	3·57	2·88

Average amount of rain in the four seasons and annually.

	Winter.	Spring.	Summer.	Autumn.	Annually.
	Inches.	Inches.	Inches.	Inches.	Inches.
London	5·00	5·30	7·30	6·75	24·55
Exeter	6·83	6·03	6·12	9·73	28·72

Average number of wet days in each month.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
London ...	14·0	16·0	13·0	14·0	16·0	12·0	16·0	16·0	12·0	16·0	15·0	18·0
Exeter ...	12·9	11·8	12·3	12·2	12·3	13·6	13·1	15·0	13·4	14·0	14·5	17·3

Average number of wet days in the four seasons and annually.

	Winter.	Spring.	Summer.	Autumn.	Annually.
London	43·0	42·0	44·0	49·0	178·0
Exeter	37·0	38·1	41·5	45·8	162·0

CHAPTER II.

GEOLOGY AND HYDROLOGY OF THE SOUTH OF DEVON.

It is so well understood that the nature of the soil modifies the climate, impresses a character upon the waters, and influences in many respects the condition of the animal economy, that, in pursuance of the plan of this work, no apology is required for devoting a few pages to a slight sketch of the geological formations of the district.

The rocks which offer themselves to notice present individuals of a very extensive series, ranging from the Granite to the lower Cretaceous and Miocene groups: the series, however, is by no means complete, many of the intervening rocks being wanting. Those which present themselves for investigation are Granite, Granitic green stone, various Trap rocks, the Grauwacke or the Devonian series (the equivalent of the old Red Sandstone), Carbonaceous* or Culmiferous rocks, new Red Sandstone (including Exeter Conglomerate), Green Sand and Chalk of the Cretaceous group, and finally the gravels, clays, and coal of the South Bovey Basin, belonging to the Miocene period.

GRANITE.—The granite of Dartmoor† varies in the size of its constituent parts, from the fine-grained to the coarse-grained

* Under this name are comprised the schists, slates, and clays so described in the Ordnance Survey.

† The granite of this district is viewed by Professor Sedgwick and Sir R. I. Murchison as referable to the secondary formation, and as being more recent than the coal measures.

and porphyritic kinds. Haytor affords examples of the former in abundance—of the latter many may be seen in the neighbourhood of Moreton, about Lustleigh, Lustleigh Cleve, and Manaton.

Porphyritic granite, consisting of a base of fine-grained granite of a tolerably uniform character, in which are imbedded large crystals of felspar, is common on Dartmoor; associated with this, somewhat rounded spots, of an almost black colour, may frequently be seen; these are a composition of black hornblende and felspar, the former predominating, of a fine grain, and approaching to the nature of basalt. This formation is composed of huge rhomboidal masses, presenting a jointed structure.*

The various elementary components of granite may be found scattered over the moor, as well as masses of the components themselves separately lying among them, excepting mica.

The quartz of Dartmoor consists of the common white quartz, in detached masses, or in veins of greater transparency, and enters into the composition of the granite in variously-sized grains, or in the form of crystals. Its colour is generally white or grey, and very often the apices of the more transparent crystals assume an amethystine hue (Dartmoor Amethyst).

The felspar is generally red, white, or grey, of various shades, but occasionally, when in contact with what has been denominated shining ore (a species of micaceous iron), it is changed to an olive green, and appears to have lost much of its crystalline

* In the *Literary Gazette*, Nov. 11, 1837, is a notice of a paper by Professor Sedgwick and Sir R. I. Murchison, where it is said,—“The jointed structure of the granite of Dartmoor is described in detail, and the joints in their direction are shown to agree with those described by geologists in Cornwall; and the authors confirm a remark of Dr. Boase, that the same master-joints often affect the granite and bedded rocks near them; they show that the granite has, in some places, broken through the stratified formations without very much changing their strike. In all such cases the beds are changed in structure near the granite; the silicious beds being converted into quartz rock, the shales into Lydian stone, felspar, porphyry, &c. They regard these facts as perfect proofs of the metamorphic nature of the rocks in contact with the granite of Devon.”

appearance, approaching to the nature of compact green felspar. Sometimes a compact green felspar is scattered thinly through a red granite.* The felspar is found in crystals of various sizes, disseminated through the granite: it is also occasionally found in very considerable independent masses, and but little mixed with other matters. Two instances of this may be observed in which the colour of the felspar is red; one at the top of the hill entering Moreton, below the turnpike; the other at the quarry near Willey, whence the Devonshire tourmaline, as it is called, was frequently obtained.

In many parts of the moor the felspar has become decomposed, lost its crystalline appearance, and crumbled into a white powdery clay. This appears particularly the case on the borders of the moor; it may also be observed on the sides of the old road leading to Moreton, and adjoining Bovey Tracey, on the road to Willey, and at Lustleigh. In this decayed state granite has obtained the vulgar name of growan stone, and affords the fine porcelain clay used in the manufacture of china, &c., so much of which is conveyed to the potteries of Worcester. It is usually met with in hollows, but in some parts of the moor, where the ground is more plain, and the clay less readily carried off, it occurs two, three, or more feet beneath the surface, forming a bed † under the quartz sand, from which, by its decomposition, it had been separated. The great plain of Bovey Heathfield affords a singular instance of this deposit (*vide postea*). It appears to have been an immense pit; at present it is filled with clay, the produce of the decayed rocks of Dartmoor. It has been bored to the depth of two hundred and twenty feet, at which depth there was still clay and sand.

The mica of Dartmoor is commonly crystallized in small plates, and varies in colour from nearly white to black. It is thinly (though generally) disseminated through the granite. It has not been found in large masses.

* Tor, near Redway.

† Dr. Paris thinks these beds good manure for the sandy plains.

The mineral and metallic substances most commonly found in the granite of Dartmoor are hornblende, schorl, tourmaline, apatite, compact felspar, numerous varieties of quartz and calcedony (Haytorite), clovite, lead, copper, tin, and iron.

Hornblende and schorl occur in considerable quantities throughout the district: they are found massive or imperfectly crystallized, as also in well characterized crystals. Amongst the red felspar, near Moreton, schorl, in fine crystals of a stellated form, is found, and, united with quartz, exhibits, in various parts of the moor, beautiful varieties of the schorl rock: near Willey it occurs in very large crystals, combined with apatite, embedded in a rock which is composed of quartz and red felspar. These specimens are now scarce.

Copper has been sparingly found, tin and lead in greater abundance. Remains of ancient stream tin works are frequently met with, and there have also been, and still are, some mines worked underground.

Iron is found in the form of micaceous iron ore. In the schist district it is wrought under the name of shining ore: an east and west lode has been worked above the village of Hennock, and another near Lustleigh. The black-lead of commerce is manufactured from it. Sulphuret of iron is met with, though very rarely; as also molybdena, disseminated through quartz near Moreton: uranite, or uran mica, has been found in some of the Dartmoor mines.

Haytorite, or pseudomorphous crystals of calcedony, occurs at Haytor (whence its name is derived), of various sizes, taking the form of quartz, garnet, and iron pyrites. Haytorite is met with as hydrophanous, stalactitic, mamillated, botryoidal, &c.

That portion of the granite which falls within our present view, begins in Sandy Park, about a mile and a half above Fingle Bridge, where it is found crossing the river from the north to the south side, directing its course about east-south-east. The boundary line then rises rapidly from the bed of the river to the hills over Moreton woods; thence it continues, in nearly the same direction, along the ridge of these hills, and almost parallel with the river, to a point south of a farm called

Lynch, on the top of the hill opposite Dunsford; from this farm it suddenly takes a southerly direction. Near Bovey Tracey it passes somewhat to the eastward, then to the southward again, until it crosses the Dart, a little above Holne. In this line the granite appears to be in contact with the carbonaceous rocks.

The surface of this district is much varied by the frequent occurrence of Tors; these are formed by various-sized rhomboidal masses of granite lying upon each other, and reaching sometimes to a considerable height. They occasionally present the most picturesque appearance. The numerous Logan stones and rock basins which have been noticed on Dartmoor, owe their origin to the decomposition of the granite. Of the former, a small one on the east side of Lustleigh Cleeve, another in the valley of the Teign, below Whiddon Park, and a third weighing about a hundred tons, at Widdecombe, are well known. The basins may be noticed on almost every part of the moor; but perhaps in few instances has decomposition produced larger excavations in this way than at Hell Tor, near Moreton.

The peat does not appear to differ from the peat of other mountainous districts: it is a network formed of the roots and stems of aquatic plants, and generally covers the wilder part of the moor; in some places it is of considerable depth. Trunks of trees have been occasionally found in it.

The surface of the decomposed granite, where a sufficient depth of soil can be obtained, is of considerable value to the farmer, particularly for the cultivation of the potato.

TRAP ROCKS.—Those of this district are either greenstone or claystone and clinkstone, and are in considerable repute for the various purposes of building, &c., almost the whole are quarried, hence their nature and situation may be easily studied.

The greenstone of this district, supposed by Sedgwick and Murchison to be metamorphic, is a true granitic compound, consisting of felspar and hornblende: the felspar is sometimes red, sometimes white—when red, the greenstone has a reddish colour—when white, the mixture of white and blackish green horn-

blende gives a greenish hue to the stone, whence its name. In many instances it is found passing through the carbonaceous rocks, and rising to the top of the hills, where its durable character often makes it conspicuous. Good sections, where it divides the carbonaceous rocks, are exposed to view on the west bank of the Teign, in the neighbourhood of Christow, Trusham, and Ashton. In the same district, and also at Doddiseombsleigh, it may be seen protruding itself through the strata to the top of the hill. A remarkable mass of greenstone, very fine grained, with an increased proportion of hornblende, is found penetrating through a high hill at Hennock, called Botter Roek. At first sight its masses have somewhat the appearance of being regularly crystallized; but, on examination, this is found to be nothing more than the irregular forms into which this rock separates. It varies considerably in appearance, as the hornblende or felspar may predominate, and according to the coarseness or fineness of its texture.

In the greenstone under Hennock is a copper and lead mine; the galena, white-lead ore, and copper, are all good. It is also connected with an extensive superficial stratum of sulphate of barytes, which extends a distance of two or three miles. Manganese occurs abundantly at Ashton, Doddiseombsleigh, &c.

Of the claystone and clinkstone traps the first or more southern mass lies immediately behind Haldon House, where it emerges from under the green and red sandstones; it extends thence through Dunehideock to a hill north-west of the village, where it terminates. It is quarried behind Haldon House, at Dunehideock, and at the last-mentioned hill.

The second mass, which appears at Knowles Hill, is separated from the former by a deep valley of carbonaceous rock: it runs down to Ide, and thence to Pocombe. It is quarried at Knowles Hill, at Western Town, near Ide, and at Pocombe.

The third mass is the well-known Northernhay rock, on which the Castle of Exeter stands. It has been extensively quarried in former times as well as recently. Its boundaries are as fol-

lows :—from the brook, opposite the back of the Castle, it crosses the field east of the county jail to Hill's Court, turns towards the Old London Inn, passes along Southernhay to the middle of the cathedral yard, crosses Fore-street and St. Paul's-street, and then, through the garden at the western extremity of the Northernhay, returns to the brook.

The fourth mass is met with about three miles on the Broadclist-road, opposite the entrance to Poltimore; thence it extends about half a mile down the Clyst river. These two latter masses are of small extent.

The fifth mass is by far the most extensive: it first appears near the road leading from Broadclist to Crabtree, and passing through Killerton Park towards the river, which it crosses, terminates some way beyond Thorverton. It is quarried in various situations, and the quarries obtain the names of the places near which they are wrought, or of the owners of the rock.

The sixth mass is at a place called Knowles, two or three miles beyond Crediton, near Cotford. At Posberry there is another mass, and, scattered about, many others of less note.

These various trap rocks, though presenting some slighter differences,* are not essentially dissimilar in their composition; they are all volcanic, and have been ejected from below as plastic masses,—hence their apparent stratification. They must have cooled rapidly on coming to the surface, for their superficial areas are small compared to their vast depth and volume. The Pocombe rock, in the immediate neighbourhood of Exeter, is an indurated claystone, containing minute particles of quartz, has no stratification, and consequently the broken fragments assume no particular form, though the fracture of the more indurated portions, which are somewhat uniform in their structure and appearance, is sometimes conchoidal: in this state it appears passing into clinkstone:—this is seldom found at Pocombe, but

* The differences of Doberry Hill are rather more marked: it is hard and compact, grey in colour, and crowded with small glistening plates of mica. This rock belongs essentially to the clay trap family, but apparently has not been subjected to a temperature sufficient to fuse its mica.

is met with at Knowles, above Ide, and in the valley below Dunchidecock. The various appearances which this rock assumes in different parts of the quarry render it easily and usefully divisible into veined and vesicular: in both these varieties, which are much intermixed, the nature of the base is the same, namely, claystone with minute particles of quartz. The veins are of several kinds, and of different sizes. At Pocombe Hill, one series of small veins may be seen to have a waved course, slightly inclined in an easterly direction; nearly at right angles are others, fewer in number, and less clearly marked. Veins of claystone, of a finer texture and of a larger size, are occasionally found filling the cracks in the rocks, usually approaching a perpendicular direction, and often containing broken and isolated fragments of the rocks. Open fissures or divisional lines, more or less general, also occur, of which those in a few particular directions are much more continuous than the others; in twenty-seven observations, at the different localities above mentioned, fourteen of these lines were found to range north-north-west, seven between west-north-west and west-south-west, three south-west by south, two south, and one south-west.

Small vesicles frequently occupy portions of the rock. These vesicles are sometimes filled with various substances; occasionally they are empty, and give the rock a honeycombed appearance; they are nearly spheroidal, and seldom contain crystallized substances, differing in this respect from claystone porphyry.* When the spheroids are considerably extended in one direction, approaching to the shape of an almond, the rock has obtained the name of an amygdaloid. In a quarry north of Rew, at the junction of the Silverton and Tiverton roads, the vesicles are well worthy of examination; in many instances they are ranged into lines from one to six inches thick, with compact trap above and below them, and in others congregated in collections of a cylindrical form, in a perpendicular direction, and also

* "Some of the rocks of this family are not unfrequently vesicular, in the manner of modern lavas, the vesicles, however, being generally filled up by some mineral substances which have since been infiltrated into them. Such substances are not unfrequently agates, and those employed in the arts are principally thus derived."—(De la Beche.)

surrounded by compact trap. The following are some of the substances met with in these cavities:—indurated clay, lithomarge, green earth, indurated clay surrounding calcareous spar, and rhomboidal brown spar, mica, carbonate of copper, steatite, &c.

These traps are generally to be observed at the edge of the culmiferous trough,—having thus, apparently, been forced through the weakest parts. This is well exemplified at Pocombe, where the mass of trap is thrust up at its junction with the new red sandstone. It has spread itself to a certain extent over the carbonaceous rock, while a small portion of it is covered by the new red sandstone—thus determining the relative ages of all these formations.

The geological position of these traps is between the carbonaceous rocks and the new red sandstone; through the former they have evidently been obtruded, while in the latter various portions of them are frequently to be met with,* so that their appearance in their present position must be considered as subsequent to the deposit of the carbonaceous rocks, but anterior to that of the new red sandstone.

These rocks are generally useful for the purposes of building: under water they are excellent, resisting its action almost equally with any known stone; when exposed to the variations of the atmosphere, that portion which is veined with calcareous spar decays soonest; the spar, losing its water of crystallization, disappears, and the masses of rock contained between the veins crumble to dust: where the veins are quartz the durability is much greater; these resist a long time the action of the atmosphere, and bind firmly together the masses of claystone which they enclose; but the most durable part of the rock is that which at first sight one would not be inclined to select, viz., the vesicular portion, whose vesicles are generally empty: it bears the tool, and can be wrought. In examining the older buildings of the district where this rock has been employed, it will be found that the faces and edges of stones taken from the vesicular part are sharp and perfect, whilst the veined stones are somewhat decayed.

* *Vide postea*, p. 80.

Probably this vesicular portion may have undergone a degree of vitrification.

The soil formed by the decomposition of these traps is exceedingly fertile, especially that at Killerton.

GRAUWACKE, OR THE DEVONIAN SERIES.*—The Grauwacke or Devonian slates, sandstones and limestones occupy, with small exceptions, the whole of the South of Devon to the west of Newton Bushell, as also that portion of the North of Devon to the north of the great culmiferous basin, whose margin there stretches from Barnstable Bay to Lutley Bridge, in Somersetshire, in a tolerably straight line from west to east. The grauwacke series has been so much disturbed by the eruption of volcanic or trappean rocks, that it is very difficult to study the rocks comprised in it. It is, however, probable that they occupy even a greater area than the carboniferous, for they dip under the culmiferous trough, and appear on either side of it. They may be conveniently divided into the following groups :†—

* In reference to this term, Sir R. J. Murchison ("Siluria," 1859, p. 292) observes—"The crystalline and slaty condition of many of the stratified deposits in Devon and Cornwall, and their association with eruptive rocks, and much metalliferous matter, might well induce the early geologists to class them among the very oldest deposits of the British Isles. In truth, the south-western extremity of England presented apparently no regular sedimentary succession, by which its grey slaty schists, marble, limestones, and siliceous sandstones, could be connected with any one of the British deposits, the age of which was well ascertained. The establishment of the silurian system, and the proofs it afforded of the entire separation of its fossils from those of the carboniferous era, was the first step in the inquiries which led to a right understanding of the age of these deposits. The next was the proof obtained by Professor Sedgwick and myself, that the "Culm measures" of Devon are truly of the age of the lower carboniferous period, and that they graduate downwards into some of the slaty rocks of this region. Hence, in the sequel it became manifest that the rocks now under consideration were the immediate precursors of the coal deposits, and stood, therefore, clearly in the place of the old red sandstone of other regions. The highly important deduction, however, of Mr. Lonsdale, that the fossils of the South Devon limestones, as collected by Mr. Austen and others, really constituted a natural history zoological group, intermediate between those of the silurian rocks and of the carboniferous limestone, was the reason which had most weight with Professor Sedgwick and myself (after identifying north and south Devon) in inducing us to propose the term Devonian.

† Vide Sedgwick, *Geological Journal*, vol. viii., p. 3.

The first and oldest may be styled the "Plymouth group,"—using the words in an extended sense, so as to include all the limestones of South Devon and the red sandstones, superior to the Plymouth limestones. The equivalent of this group in North Devon includes the Ilfracombe and Linton limestones, as well as the sandstones of the north coast.

The second group includes the slates in which no fossils have been found, extending from Dartmouth to the metamorphic group of Start Point and Bolt Head. It may be styled the "Dartmouth group;" its equivalent in North Devon are the slates of Morte Bay, which terminate in beds of purple and greenish sand-rock and coarse grauwacke. This group ranges nearly east and west across the county.

The third group is not, perhaps, found in South Devon, but in North Devon it is well defined, commencing on a base line of the sandstone beds, which range nearly east and west from Baggy point (on the west coast) to Marwood, a few miles north of Barnstaple, and thence toward the eastern side of the county; this group is continued in ascending order, to the slates on the north shore of Barnstaple Bay; but its highest beds are seen on the south shore of the bay dipping under the culm measures. The equivalent of this third and higher Devonian group is found to the south of the great culm trough, in a group near the top of which appear the limestone band and fossiliferous slates of Petherwin. It may be called the "Barnstaple or Petherwin group."

The slates vary, from a tolerably fine roofing slate to a shaly ash, and occasionally pass into compact and vesicular dunstone. Their colour, though chiefly grey and red, presents every shade between these and brown. The arenaceous conglomerate, with which they are associated, is for the most part schistose or micaceous in its character; in some places it contains quartz pebbles about the size of a nut.

The slates of Start Point are metamorphic, very peculiar in their structure, and, as suggested by Professor Sedgwick, show that "a great axis once existed along the south coast of Devon and Cornwall," but which has been, in the course

of the geological changes that have taken place, swept away.

The Grauwacke slates were, until lately, supposed to be deficient in fossil remains. Encrinites, turbinolias, trilobites, &c., have, however, been found in tolerable profusion; organic remains have also been found in the trappean ash immediately beneath the limestones. "The slates and limestones are, in fact, both more or less fossiliferous, but the limestones are probably richer than the slates."*

The limestones † of this series are, for the most part, compact, hard, and semi-crystallized; some masses are met with very highly so, especially when in contact with the greenstone porphyry. The prevailing colour is a dark blue; it is, however, not unfrequently black with white veins, yellow, red, white, and grey. They are much more massive than those of the carbonaceous group, and appear to have been produced under different circumstances. The carbonaceous limestones are characterized by but few fossil remains, while some portions of those of the Devonian group are teeming with them. They

* Pengelly—*vide* Paper on the Fossils of South Devon.

† The limestone is very generally allowed to be referable to the transition series. "The origin of the limestones," Sir H. De la Beche observes, "is far more difficult of explanation than the sandstones and slates in which they are included. We cannot well seek it in the destruction of pre-existing calcareous rocks; for as far as our knowledge extends, such rocks are of comparative rarity among the older strata. In fact, the quantity of calcareous matter present in the grauwacke group greatly exceeds that discovered in the older rocks; and the same remark applies to many of the newer deposits when considered with reference to the grauwacke series. If we take the mass of deposits up to the chalk inclusive, we shall find that, instead of a decrease of carbonate of lime, such as we should expect if that contained in each deposit originated solely from the destruction of pre-existing limestones, the calcareous matter is more abundant in the upper than in the lower part of the mass; and we may hence conclude that this explanation is insufficient. If, as has been done with other limestones, we attribute the origin of the grauwacke limestones in a great measure to the exuviae of testaceous animals and polypifers, we must grant the animals carbonate of lime with which to construct their shells and solid habitations. This they may have obtained either in their food or from the medium in which they existed. The marine vegetables are not likely to have supplied them with a greater abundance of carbonate of lime at that time than at present. Those that were carnivorous might acquire much carbonate of lime by devouring other animals more or less possessed of this substance: but the difficulty is by no means lessened by this explanation; for the creatures devoured must have

consist, for the most part, of corals, with *testacea*, *crustacea*, &c.

The geological position of these masses of limestone appears to be that of beds alternating with, and deposited in, the slate formation: though found in connection with some of the trap family, yet these latter always appear to have been thrust into apposition by violence, at the junction of the carboniferous and Devonian groups, and are therefore not naturally associated with them. The bands of limestone were, in fact, deposited at the same time as the slates, whilst the trappean rocks have evidently been intruded amid the slates and limestones after these latter had been consolidated. At Blackhead, Babbicombe, the greenstone appears to have been erupted through the lime, in one place overlying it, and in another situated beneath it. When the traps and limestone thus come into apposition, changes are frequently observed to take place in both—the limestone becomes more highly crystallized, and the trap rocks assume (though but very rarely) a character not unlike serpentine.

Bone caverns occur in the Babbicombe and Chudleigh limestone rocks very similar to that at Kirkdale, described by Dr. Buckland.* The floors of these caverns are covered with a

procured the lime somewhere. It would appear that we should look to the medium in which testaceous animals and polypifers existed, for the greater proportion, if not all, of the carbonate of lime with which they constructed their shells and habitations. Now, if we consider the mass of limestone rocks to have originated from the exuviae of marine animals, we are called upon to consider that carbonate of lime was once far more abundant in the sea than we now find it, and that it has been gradually deprived of it. This supposition would lead us to expect, that as the sea was gradually deprived of its carbonate of lime, limestone deposits would become less and less abundant; and consequently, that calcareous rocks would be most common, when circumstances were most favourable, that is to say, during the formation of the older rocks. This, however, is precisely the reverse of what has happened. Hence we may infer that the origin of the mass of limestone deposits must be sought otherwise than in the attrition or solution of older and stratified rocks, or from the exuviae of marine animals deriving their solid parts from a sea which has gradually been deprived of nearly all its carbonate of lime. Both these causes may have eventually produced important modifications on the surface of the earth; but the great proportion of lime necessary for the formation of the calcareous masses covering a considerable part of it would appear to have been otherwise obtained."

* Reliquiæ Diluvianæ, p. 8.

mixture of calcareous deposit and clay conglomerate, in which the bones are imbedded, and this is again covered over with a thick layer of stalagmite.*

Though it is extremely difficult to determine the true dip of the beds of this formation, for the cleavage planes vary from a perfect parallelism with the planes of the bed to very considerable extent, and are sometimes constant in their direction and dip, while the beds they traverse are much contorted, yet it may be inferred, as it would appear, that the large masses of associated limestone "dip at a high and tolerably constant angle towards the south; and as no unconformability between them and the slates is found, it does not appear that any important physical change occurred in this area during the era of their deposition."

The geological position of this Devonian series is below the carbonaceous rocks and the new red sandstone, being equivalent, in time, to the old red sandstone of the north of England.

The clayey soil formed by the decomposition of the Devonian

* The Torquay Natural History Society, in 1846, re-explored Kent's Cavern, in order to determine the theories relative to the formation of the cave, and to furnish their museum with specimens of its fossil remains and antiquities. The following account is taken from the "Torquay Directory and South Devon Journal":—

"The Cavern, as we have already noticed in our report of a lecture recently delivered on the subject, is situate about a mile from Torquay on the road to Ilham, extending about 700 feet in a circular form, beneath a conical hill of the Devonian limestone. Its fossil remains are similar to those found in Kirkdale, and the bone caverns so fully described by Dr. Buckland and other writers, consisting principally of extinct species, some of them almost peculiar to this cavern.

"The spot chosen for resuming the research was at the entrance of what Mr. McEnery, in his unpublished Memoir, calls the Wolf's Den, from the skull of that animal which was found there, at the bottom of the principal slope, about thirty yards from the lower entrance. On clearing away the rubbish accumulated in former diggings the following section was presented to view—first, a thin layer of soil consisting of the red loam which had been turned up in searching for bones; below this a thin layer of black animal or vegetable soil, containing mussel shells, fragments of burnt wood, &c. &c., apparently the remains of the earliest human inhabitants; this rests upon a mass of stalagmite, formed by the droppings from the roof, and precipitated from the water which trickles through the cave, varying in depth from one to three feet, of an uniform texture, wholly unmixed with any foreign matter, excepting at its surface, where dark streaks are discernible for about a quarter of an inch, as if caused by the deposit of earthy matter which was successively covered with the thin layers of stalag-

slates is somewhat stiff and cold. It is very good for wheat; oats grow well in it. In the valleys, where the washings of the hills are accumulated, the soil is deep and exceedingly prolific. The contour of the whole country is that of a succession of large bosses. This, by permitting the sun's rays to meet the earth at such an angle as reflects them into the valleys, accumulates the heat, and greatly adds to the climatic temperature.

THE CARBONACEOUS SERIES.—The carbonaceous, or culmiferous rocks, occupy the central area of the county, forming, as it were, a very large parallelogram, the northern boundary of which stretches, east and west, from Bampton to Barnstable Bay; its southern, from Kingsteignton to the great granite mass of Dartmoor, round whose northern side it skirts, and then, from Brent Tor, passes westward, winding along the edge of the Granitic Series, through Launceston, till it meets the sea at Boscastle. On the eastward side, or boundary, from Kingsteignton, it passes northward by the side of the Green Sand of Haldon to Exeter, whence it reaches away as far as Hatchleigh

mite; below this the pure grain of the mass would seem to show that the eavern was wholly undisturbed and uninhabited during its deposition; below this a bed of broken rocks, the masses becoming larger as they descend, reaching to the depth (according to Mr. McEnery) of from fifteen to twenty feet; the stalagmite has infiltrated into the upper layer of these, the whole being imbedded in a solid bed of red loam containing the fossil bones. On re-examining the earth thrown out by former explorers, several teeth and bones were found, as also in the unmoved bed below their workings.

“Particular attention is directed to the discovery of flint knives, or any other human remains, which Mr. McEnery considered that he had found in the loam below the unbroken floor of stalagmite, and his observations have been in a measure confirmed by the discovery of two flint knives in the situation which he describes, but as it is extremely difficult to ascertain whether the soil has been moved before, either by modern explorers, or by the ancient inhabitants, it would be premature to conclude that they were coeval with the fossil bones; as the examination proceeds, fresh ground will be opened, and more certain evidence may then be obtained. Close to one of the knives, was a modern mother-of-pearl button, evidently dropped by some visitor and trodden into the soil.

Upon the surface, near the entrance, on turning up some loose rocks, numerous shells of fish, apparently used for food, were discovered, as scallops, limpets, mussels, &c., mixed with bones and burnt wood; amongst these was a small glass bead, similar to those found in the barrows, and a base for forming pottery similar in form to the Kimmeridge coal money, some fragments of black glazed pottery, and two flint knives.”

and Huxham; from thence, spanning over a peninsula of new red sandstone, which pierces the carboniferous group, like a narrow wedge, as far as Jacobstow, it appears again at Rouch, and on to Tiverton, where another small wedge of new red sandstone interposes. It is met with again at Bartridge and Holeombe-Rogus, where are some immense masses of limestone. At Kitsford, in Somerset, we come to the north-east angle of the trough.

It will be useful to divide this series of culmiferous rocks into lower and upper beds.

The lower bed consists of calcareous strata, traversed by innumerable veins of calcareous spar and alternating black limestone, particularly in the north of Devon. The strata frequently breaks up into cuboidal divisions, so that it is somewhat difficult to determine which is its true lamination plane and which is cleavage. The most frequent form, perhaps, is rhomboidal; very good examples of this may be seen in the neighbourhood of Exeter. Where the slate reposes on the granite,* or comes in contact with the greenstone, it assumes a peculiar mineral structure, is an exceedingly hard compact rock, of various tints, grey and blue, occasionally reddish and olive-green. The slaty structure, in its perfect crystalline state, is not always discernible in it, but may generally be seen on the approach of decomposition and decay. This metamorphic form of the lower carbonaceous rock may be conveniently designated the Coddon-Hill grit.

The limestones skirt the whole of the great culm basin, appearing principally in long narrow strips or bands.† Asso-

* "The great eruption of the granite of Dartmoor, which affected both the Devonian and carboniferous strata in contact with it, has so usurped the place of the regular deposits in South Devon, that in vain do we look either there or in Cornwall for the same clear order as in North Devon. In fact, the derangement in the western portion of South Devon, and the adjacent parts of Cornwall, is so great that the lower silurian rocks are seen, as already stated, to overlie true Devonian rocks. The metamorphism of some of the schists has, indeed, often given to them the semblance of the oldest primary rocks."—"Siluria," p. 295.)

† The form of these bears much resemblance to the coral reefs of the Pacific and round the "Isle de France," &c., or to the lagoons; but, inasmuch as these limestones are very poor in fossils, they cannot, like the coral reefs, be attributed to the work of zoophytes.

ciated with the grit, beds of limestone are met with at Drewsteignton and at Doddiscombsleigh; those at Chudleigh, and under Haldon, probably belong to the Devonian series.* At Doddiscombsleigh, the grit itself is highly calcareous, and contains fossils. At Drewsteignton numerous thin strata of carbonaceous rock and limestone alternate with each other. These are bent and folded in various directions. "Were we to take a number of alternating sheets of black and brown paper, and fold them nearly round a wine decanter, and then bend them back over the lower folds, we should have a not inapt representation of the singular contortions of the strata in this place."

Posidonia have been obtained from Drewsteignton, and fossils of several genera, including trilobites and a portion of a fish jaw, have been found at Doddiscombsleigh. The junction of the limestone with granitic greenstone may also be observed at Doddiscombsleigh. At Chudleigh it is found imbedded and intermingled with the red sandstone and conglomerate.

The minerals of common occurrence are micaceous iron ore and manganese, and lead and copper in small quantities. In following the veins of manganese in the parish of Doddiscombsleigh, beds of jasper are found associated with them. Some of this jasper is of great beauty, and in every way identical with the eyed jasper of Siberia.†

The upper culm measures occupy the greater portion of the great culm trough, and consist of various thin-bedded strata of arenaceous rock, schists, and clay, alternating with each other; the slate may be distinguished from the Coddon Hill grit by its tendency, in all the schistose beds, to separate into pieces approaching a rhomboidal form, and by the great abundance of small fragments of vegetables, with which some of its beds abound. These strata are usually found conformably

* Mr. Austen refers the limestone under Haldon, as also that at Chudleigh, to the lowest band of the carbonaceous series.—(*Vide Athenæum* Feb. 24, 1838.)

† "The only bed of jasper that I have seen among the English rocks occurs associated with beds of manganese ore at Doddiscombsleigh, in Devonshire."—(Bakewell's "Geology," p. 142.)

overlying the Coddon grit, though in some cases their separation may not be very distinct; generally the individual beds appear to spread over very limited areas, and, in their direction, to be quite independent of the more extended course of the entire mass of strata.

They are coloured variously with tints of grey, blue, green, and red, generally dull. They vary much in hardness and durability, being in some places friable, in others exceedingly hard, and have occasionally a conchoidal fracture. It is a stone very well adapted, and frequently applied, to the purposes of building and road-making.

The schistose rocks appear of a firmer and more crystalline structure as they approach the granite,* and the same appears to be the case as it is followed deep in the earth: on the other hand, they become less compact as they approach the red land that bounds them on the side opposite the granite. Near the granite, and at great depths, they are for the most part of a deep blue; whilst at the surface, where they are decomposed and near to the red sandstone, the various tints of red, green, and purple are most commonly met with.

In many places they pass into the variety called roofing slate,† having a perfectly smooth and even cleavage, and a close, compact texture.

The position of these rocks is considered to point out the existence of an anticlinal axis ranging from the neighbourhood of Dunsford towards Exeter, on the respective sides of which the general dip of the strata, independent of the contortions they exhibit, is towards the north and south, with some slight deviations from those points. In some parts of the line of axis the strata appear quite vertical, as may be seen between Holcombe-Burnel and Dunchidcoch, and generally, on either side, the angle of inclination is great. The contortions in this and the accompanying series are numerous and extensive. "No

* In all such cases the beds are changed in structure; the silicious beds being converted into quartz rock; the shales into Lydian stone, felspar, porphyry, &c.

† Quarry at Tedburn, and veins in neighbourhood.

words can exaggerate the number and violence of these contortions; sometimes in regular undulating curves, sometimes in curves broken at their points of contrary flexures, and exhibiting a succession of cross-like regular pointed arches." In order to account for these contortions, the following explanation is offered. Assuming that the strata which compose them have been deposited under water, in a position, as regards the whole mass, nearly horizontal, but, as regards individual parts, at the various angles of inclination which might be produced by alterations in the currents of water by which they were formed; that subsequently, when in a partially indurated condition, they were disrupted, and rapidly elevated, nearly to the positions in which they are now found; and that, finally, when thus turned up almost on their sides, and whilst the effects of gravity and lateral pressure were acting on the unsettled masses, a partial subsidence took place; the strata, formerly straight, would in some cases become curved, and those originally curved would have their curvatures greatly increased, and thus present to view the contorted and broken lines of stratification observed in these rocks.

This formation contains many vegetable impressions, of which the chief are *Cyperites bicarinata*, *Pecopteris lonchitica*, the knots, apparently, of a sigillaria, and a great variety of calamites, as well as goniatites, and other marine fossils. These usually occur in somewhat flattened concretionary nodules, which are found both in the soft and hard beds, and in many cases seem to have constituted *nuclei*, around which the oxide of iron, alumina, iron pyrites, and other minerals of which they are composed, have collected. The neighbourhood of Pinhoe, near Exeter, has been very productive in these fossils; they have also been discovered in the same range of hills on the south-eastern side of the Exe, near Oakford Bridge on the Creed, at Clecve, near Newton St. Cyres, and near the Okehampton-road, about five miles from Exeter. In the upper beds of this series, at Pinhoe and Clecve, casts of the beautiful *goniatitis inconstans* occasionally occur with numerous little fossils about the size of a large shot, which have been regarded (Parfitt) as the eggs of a marine animal.

The geological position of these rocks is above the Devonian series, and beneath the new red and green sandstones. In some places it is overlaid by patches of the green sand, and west of Bideford by conglomerates of the new red sandstone. The upper eulin strata of Devon have, in fact, been identified by Sedgwick and Murchison, "as the geological equivalents of the ordinary British coal fields."

Good sections of these strata may be seen on one or both sides of the Exe, from Stoke Canon Bridge to Exeter, and in many other places in the neighbourhood.

The soil produced by the decomposition of the superficial parts of this formation is well adapted to the growth of wheat, but the manner in which it is broken into a continuation of steep hills and narrow valleys, and the stiffness of the soil, are considerable impediments to its attaining a high state of productiveness. The oak thrives well on it, and its frequency is distinctive.

The minerals of this formation most commonly worked are limestone, iron, and lead.

NEW RED SANDSTONE.—The new red sandstone of this district is of considerable extent, and occupies that portion of the county which stretches along its eastern side, from Torbay northwards, into Somersetshire. It differs, in many respects, from those hitherto described, and which were shown to be more or less crystalline in their structure, and to have their beds, with the exception of the granite, highly elevated, whilst the new red sandstone possesses neither of these qualifications. This formation is composed, for the most part, of nearly horizontal beds of loose fine-grained sand, passing by various degrees of hardness into compact sandstone, clay, marls, and conglomerate.

The conglomerate part of the red sandstone, in its general aspect, is a dark red, passing into a dusky brown. It is composed of various sized masses of angular limestone, grauwaek slate, flinty slate, trap rocks, and quartziferous porphyry,*

* "The component parts, or rather the mineral contents of the more recent portion of this formation are various: remains of granitic, porphyritic, and grauwaek rocks, form a considerable part of the imbedded fragments; crystal-

cemented together by an argillaceous paste. The separate masses of the conglomerate are of the greatest magnitude in those parts of the rock which more nearly approach the older series; and although many of these masses are partly composed of the traps which occur in the neighbourhood, yet they also contain in abundance red quartziferous porphyry, which has not been observed *in situ*.* It should also be observed, as a fact of some importance, that the red conglomerate does not in any way

line, semi-vitreous, and earthy felspar, of a reddish brown colour; quartz; common schorl (occasionally this and the last are met with distributed in small contemporaneous veins, apparently crystalline); chlorite; brown manganese ochre in occasional cavities; calcareous spar; and limestone (occasionally with coralloid remains). All these are for the most part mixed promiscuously in the same stratum; occasionally particular substances predominate, but seldom, if ever, to the total exclusion of all others; the quartzose and porphyritic fragments are but slightly rounded—in some cases not even perceptibly so; the calcareous portions have usually the appearance of being worn by attrition.”—(Kingston.)

* “The presence of these porphyries in the red conglomerate of South Devon is remarkable, inasmuch as, though rolled, masses of the same kind are not observed unconnected with the red conglomerate of the same county. The absence of such rocks on the exposed surface is certainly no proof that they may not be near; for when we consider the area covered by the red sandstone series in that district, there is ample space for the abundant occurrence of such rocks beneath the sandstone; and there are also many unexplored situations where they may yet be detected among the rocks now uncovered by the sandstone series. The student must be careful not too hastily to generalize on such facts as have been above noticed in Devonshire, for the appearances may be more or less local. When, however, we extend our observations, we find that conglomerates are very characteristic of deposits of the same age in other parts of Britain, France, and Germany, and they most frequently, though not always, rest on disturbed strata. As we can scarcely conceive such a general and simultaneous movement in the inferior strata, immediately preceding the first deposits of the red sandstone series, that every point on which it reposes was convulsed, and threw off fragments of rocks at the same moment, we should rather look to certain foci of disturbance for the dispersion of fragments or the sudden elevation of lines of strata, sometimes, perhaps, producing lines of mountains, in accordance with the views of Elie de Beaumont. The accumulation of the larger fragments, and the relative amount of conglomerate, would, under this hypothesis, be greatest nearest the disturbing cause; and amidst such turmoil we might anticipate the occurrence of igneous rocks thrown up at the same period. If we return for the moment to that part of Devonshire with which we commenced these remarks, we shall observe facts which seem to afford support to this view; for where the conglomerates are abundant, there is no want of trappean rocks in the vicinity, such as various greenstones and porphyries, which have cut and broken through the slates, limestones, and other older rocks, in various directions: and I had recently an opportunity of observing that red quartziferous porphyry, precisely resembling some of that which occurs so abundantly in rolled fragments in the red conglomerate of the

appear to be composed, or to contain portions, of the dark-coloured porphyries which are rocks of the neighbourhood.

The extent to which this very interesting formation is quarried, or naturally laid open to view, enables it to be easily studied. The line of junction between it and the slate passes through the north-western side of Exeter. Between the Engine Bridge and the Head Weir the mill leat is bounded on one side by a high rock, chiefly composed of carbonaceous slates, crossed by numerous veins of white quartz, and which may be conveniently examined at the weir. From this it extends down the river to a line drawn from the bottom of Fore-street to Little Barley House, where it meets with the red conglomerate. The nature of this conglomerate, the direction and dip of its strata, and the differences which exist between it and the schist, may be

district, is found in mass among the lower portion of the latter, and even (at Ideston, near Exeter,) surmounts a portion of it. But notwithstanding the abundance of the greenstones and dark-coloured porphyries, not a fragment of them has yet been discovered among the conglomerates, though rolled portions of the red porphyries are so abundant: and it should be observed, that good sections are by no means rare, particularly on the coasts. This fact seems to attest that the dark-coloured trappean rocks did not exist in such a state, when fragments of slate, limestone, &c., were broken off, that they could be fractured and broken with the rest; though it does not show that trap rocks may not have been protruded at the time of the convulsion, thus aiding the confusion, and in a great measure causing it. On the contrary, we have every reason to consider that the eruption of trap rocks did accompany, if partly not produce, the disruption of strata, whence the fragments in the conglomerate were derived: for we have seen that red quartziferous porphyry, in mass, surmounts a portion of the red conglomerate; and the occurrence of trappean rocks (principally of a red or brown tint, and containing much silicious matter), so blended with the conglomerates that lines of separation cannot be drawn between them, is by no means rare in the district (Western Town, Ideston, and other places in the vicinity of Exeter). Now, if igneous rocks were ejected—a conclusion which the facts appear to justify—at the time of the production of the conglomerate, there would seem no reason why, under favourable circumstances, the two should not be in some measure blended with each other. Another circumstance also lends probability to this view, and that is the occurrence of pebbles cemented in certain inferior beds (well observed on the coast and inland between Babbicombe Bay and Teignmouth, at the Corbons, Torbay, in the vicinity of Exeter, and other situations,) by a kind of trappean paste, containing crystals of that variety of felspar named Murchisonite by Mr. Levi. Such a cement might possibly have resulted from the upburst of igneous rocks, accompanied by various gases beneath a mass of water, when some of the erupted matter may have so combined as to form a cement, in which crystals of Murchisonite became developed: without some such hypothesis this cement seems of very difficult explanation."

(De la Beche.)

investigated at the Quay. The Heavitree and Exminster quarries, from their vicinity to Exeter, offer excellent opportunities for studying this formation in detail. The following is Dr. Berger's excellent description of the former quarry :—

“The quarry of Heavitree is situated about a mile and a half from Exeter, on the road to Honiton. It is worked to the extent of a quarter of a mile in length, and to the depth of about ninety or one hundred feet, in a plane intersecting that of the strata. The rock worked in this quarry is a conglomerate evidently stratified; the strata are from six to eight feet in thickness, and dip south-east at an angle of about 15° . As long as this rock preserves the character of a conglomerate, it is compact and tenacious, and, according to the report of the workmen employed in the quarry, hardens by exposure to the air, but as soon as it passes to the state of an arenaceous stone, becomes tender and friable. It is very common to see blocks of it in this last state, and sometimes of a great size, included in the middle of the conglomerate. The cement of this rock is argillo-ferruginous, and by itself does not effervesce with acids; but it produces so brisk an effervescence from the calcareous particles that are intimately mixed with it, that it might be very easily mistaken for limestone. The substances which enter into the composition of this conglomerate are numerous; it may first be remarked, that these are of very different sizes and forms, sometimes rolled and rounded, sometimes pointed with sharp angles, from very minute grains to the size of several inches in diameter. There are found in it rhomboidal crystals of calcareous spar; felspar, most frequently of an opaque white, and decomposed; siliceous nodules; grauwaacke; yellowish limestone; rolled masses of a sort of porphyry, which somewhat resembles the antique, having a base of a reddish brown colour, not effervescing with acids, and containing numerous small and well-defined crystals of felspar imbedded in it; pieces of a rock which is itself compounded, having the appearance of a porphyry, the base earthy, and including small grains of quartz, crystals of felspar, and pieces of bluish carbonate of lime, together with a whitish tender steatite, in small angular fragments.”

In no locality, however, is this formation laid so extensively open as from Babbicombe to Branscombe.* The rocks of this coast consist entirely of the red conglomerate, which may here be examined in all its varieties.

Between Pettytor and Teignmouth it is seen frequently occurring with limestone and schist, and at Babbicombe with greenstone.† Near Teignmouth and Dawlish large masses of a more indurated structure present themselves; these, as the surrounding sandstone is washed away, retain their position, or fall outwards upon the beach. They are available for building material, and are particularly interesting from containing quartziferous porphyry in large quantity. This indurated and conglomerate character of the rock invariably decreases as we leave the district in which the trap and older series occur. Some of the conglomerates are sufficiently calcareous to admit of their being burnt for lime. One instance of this is near Oakford Bridge, south-west of Upton Pyne; and near Pinhoe a rock of a somewhat similar kind is quarried.

At Exmouth, where the rocks face the sea, there are two remarkable beds of whitish sandstone, extending nearly from the top to the bottom of the cliff: near the bottom a considerable dislocation has taken place, and portions of the beds appear to have fallen, and are found under the sand of the shore in a nearly horizontal position.

In many places this conglomerate is crossed in different directions by veins of a more durable nature than the general mass of the rock itself; this latter decaying on exposure to the atmosphere, leaves the projecting hard veins; thus various

* "In noticing the structure of the new red sandstone, the chief subdivisions of the formation present the following geographical arrangement, proceeding from east to west:—1. Marls, with gypsum, as far as Sidmouth. 2. Sandstone from that town to a little beyond Exmouth. 3. Shingle and conglomerate to the western boundary of the formation, the pebbles, derived from the adjacent older rocks, increasing in size towards the edge of the deposit; and from this distribution he inferred that the conglomerate marks the original shore of the sea in which the new red system was deposited; the sandstone, the fine detritus carried in a certain distance from it; and the marl, the mud diffused through the water, and conveyed to a still greater distance." (Notice of Mr. Austen's paper read at the Geological Society, *vide Athenæum*, p. 152, Feb. 24, 1838.)

† *Vide* p. 73.

curves and hollows are formed, which give to the rock a honey-combed appearance. These veins, where they approach the older rocks, are mostly composed of sand and iron agglutinated together, but in the vicinity of the chalk formations they consist of calcareous spar.

The loose sand varies in colour from the brightest red to white, and is composed of very differently sized grains: these are partly silicious and partly decomposed felspar; and so far as these, which are its essential components, are concerned, does not effervesce on the addition of acids. There is, however, in many districts the accidental admixture of carbonate of lime, which offers this reaction, and might mislead those unacquainted with the true composition of the red sand formation. The compact sandstone, which, for the most part, occurs in shallow beds under marls, &c., is of a dirty yellow colour, occasionally stained in some places black, but most generally tinged red by oxide of iron. It is coarse-grained, and available for many purposes. In the immediate neighbourhood of Exeter it is rarely sufficiently compact for millstones.

The clay in colour is a dirty red, occurs in beds, and, though frequently passing into a friable sandstone of an argillaceous character, is very available for brick-making.

The marls are of different colours, and in every respect appear to be identical with the variegated marls of the district of the Vosges,* as minutely described by Elie de Beaumont. They present colours of a wine red, and greenish and bluish grey, with thin beds of black slate clay, and of quartzose sandstone, nearly without cement. They break into fragments, which have nothing of a slaty structure. Amongst the marls west of Budleigh Salterton there occurs a bed of loose pebbles, seventy feet thick, of extremely hard silicious rock, much water-worn. They

* De la Beche, when speaking of the variegated marls, says: "Where seen on the southern coast of England, between Lyme Regis and Sidmouth, the upper part of the red sandstone series is so like the variegated marls of the Vosges and parts of Germany, that I have little hesitation in considering them contemporaneous deposits. In this part of England these marls contain vegetable remains, and, though rarely, scales of fish, and bones of pterodaelytes (?). According to M. Rozet, the upper part of the variegated marls contains the teeth and bones of saurians, with *Pectines* and *Entrochi*."

follow the ridge from Straitway Head, and are probably pebbles from the green sand or the chalk formation.

About half a mile to the west of Broadclist, a quarry of sandstone was lately worked, in which the above varieties of this formation may be well studied. On the surface the soil is observed to be composed of the disintegrated rock; immediately underneath there is a loose, coarse-grained red sand; then a layer of almost black sandstone, which, on drying, appears composed of small dark-coloured grains, without the admixture of any cement; below this are several layers of various coloured marls lying upon horizontal beds of a compact dirty yellow sandstone, and which is being worked for the purposes of flooring, &c.

Though this formation is nearly horizontal, yet there is a general dip towards the east, rendered irregular by the numerous faults that intersect it; and many of the beds being subordinate to the whole, dip at very different angles, and in as many directions. We not unfrequently find between two layers which are horizontal an intermediate one with a dip almost perpendicular, and in other places the beds assume a waving and even a circular direction:—in fact, there appears to be no variety of position to which this red conglomerate formation is not subjected. The composition of the adjoining layers is frequently very different, some being of a fine sandstone, some a stony conglomerate, some of a bright red, and others a dusky yellow, &c. Sir H. De la Beche argues from this that there must have been great variety both in the force and direction of the currents in which this formation was suspended before it was deposited.* The line of sea-coast from Torbay to Sidmouth affords the best sections of these strata, and others may

* “It may be right, while on the subject of these Devonshire conglomerates, to adduce evidence of the unequal action of currents of water in this vicinity at the same period. There is perhaps no situation where better examples of this can be observed than on the line of cliffs between Babbicombe and Exmouth. The alternations of conglomerates and sandstones at the upper part of the conglomerate series are very frequent, more particularly in the vicinity of Dawlish; showing that the water had sometimes the power of carrying forward rounded fragments of the size of the head, and even larger, while at others it merely accomplished a transport of sand. Not only do the alternations exhibit this difference in the velocity of water, but the structure of the beds themselves shows

be seen inland. Between Kennford and Haldon a part of the conglomerate is exposed, where it rises rather rapidly, and terminates abruptly at the edge of the hill against the green sand. Sections of the subordinate layers of sand, &c., may be examined at the sides of the roads, and in sand pits, from Exeter to the neighbourhood of St. Mary's Clist, Broadclist, &c.

Faults in the beds of this formation are very frequent. A circumstance attending these is well worthy of observation: one portion of the layer of the rock is raised perhaps four or five feet above that which corresponds and was originally joined to it; the summits of both portions are then covered by a loose stone rubble, which is again surmounted by a layer of red sand; neither this latter nor the loose stone rubble are affected by the fault, but occupy the broken summits of the red conglomerate in horizontal and continued beds. This upper layer has been called a Regenerated Sandstone, but is nothing more than the matter left by the water which denuded the surface of the strata. Examples of this may be seen in many places, as at Langston Cliff, near Dawlish, and on the hill near the four-milestone on the Tiverton road.

The new red sandstone of this district, with its conglomerates, offers no exception to the general deficiency in fossil remains universally observable in this series. Reposing and covered by strata richly fossiliferous, this deficiency is the more remarkable. A quarry at Broadclist, half a mile to the north-east of the church, has yielded some specimens of ripple-marked stones, tracings of annelides, the clawlike feet-marks of two species of small crustaceans, and obscure impressions of other objects (*Possidonia*). The singular concretionary masses found near

that the directions of the currents have continually varied. Amidst sandstones and moderately-sized conglomerates on the west side of Little Haldon Hill, there are blocks of quartziferous porphyry, generally rounded, of a ton or more in weight. Being scattered on the side of the hill, they might be mistaken for superficial erratic blocks, did we not find them in their proper situations on the sea cliffs imbedded in the mass of rock. The transport of these must have required water moving with considerable velocity, so great, possibly, as to grind down by attrition against each other the rock fragments of inferior hardness, while the pieces of quartziferous porphyry, being exceedingly hard and of very difficult fracture, have better resisted attrition."

Pinhoe, and others in the cliffs at Exmouth, require further examination to determine whether they are casts of organized bodies, or simply mineral concretions. In a cutting at Cockwood, between Starcross and Dawlish, a black peaty-looking substance has been found,* which would indicate there had been dry land at no very great distance. It is also said some portions of fossil vegetables have been found in the marls at Sidmouth.

The geological position of the new red sandstone is above the carbonaceous rocks and below the green sand. In this district limestone and trap rocks sometimes intervene between it and the carbonaceous bed. The higher hills only are capped with the green sandstone on the coast beyond Sidmouth. This capping becomes more frequent, and the superincumbent chalk is met with. On sinking wells in Exeter, the red sand is found at a depth varying from ten to fifty, and even eighty feet, and then afterwards the carbonaceous rock. Its passage under the green sand may be easily seen on ascending any of the green sand hills in the vicinity, as Haldon, &c.

The soil of the conglomerate districts is generally dry and not particularly fertile, but when the sands have a sufficiency of more compact materials mixed with them, or if well manured, their productive quality is good. In some parts the marls are firm and retentive, and consequently suffer much from excess or deficiency in the supply of rain.

GREEN SAND.—The green sand formation of this district occupies the summits of many of the higher of the red sandstone hills, commencing in the south from Milber down to the Haldons, thence to Blackhill, and Woodbury to Sidmouth, beyond which it occurs in larger masses. It consists of beds of sand, sandstones, and chert, of very various colours and compactness. The prevailing colour is that of a light green, which is chiefly owing to the presence of chlorite. Masses of this formation are, however, met with of other colours, as light dusky yellow, brown, red, &c. The basis of the green sand is argillo-

* By Mr. Parlitt.

arenaceous; and it contains mica and a large variety of fossil remains.* In the chert, which is of common occurrence on Haldon, both the mica and chlorite are wanting.

Though the general character of the green sand in the neighbourhood is that of a loose and slightly-adhering compound, yet in some places it is sufficiently consistent and hard to be available as fire and whetstones. In this latter state it is found on the Blackdown range and the eastern side of Haldon.

Rolled flints, identical with those of the chalk formation, lie, especially on Haldon, in the greatest profusion on the green sand; and on the Sidmouth hills there is a superficial detritus of chalk. Mr. Austen thinks that the green sand of the Haldons has been elevated by the action of a subjacent mass of trap, portions of which, he says, are visible at the extremities of the hills. He is of opinion that the preservation of these insulated patches of green sand has been owing to their having been raised above the level of the waters which denuded the surrounding districts.

The geological position of the green sand is between the red conglomerate and the chalk; it rests upon the former, and is surmounted by the latter.

Of this formation, there now fortunately only a small portion remains. It is very unproductive; save elms, but little thrives in it.

CHALK.—This formation occupies so small a place amongst the Devonshire rocks as to require no very particular comment. It is generally supposed that the area now and formerly covered by the green sand was also covered by the chalk. That the chalk existed on Haldon is evident, for not only are there the unrolled flints, but likewise masses of chalk. In the upper sand pit the superior portion of the beds appears to have been dis-

* "Its characters are chiefly that of a fine-grained sand of various texture, from a friable character to a compact silt, and all more or less coloured by chlorite; it frequently contains nodules of gypsum, and abounds with fossil remains, chiefly univalve and bivalve shells. Incumbent on this formation, both on the summit of Milburn Down and the other hills, are strata of chalk flints. These beds were probably continuous also with those of Black Down to their termination in Dorsetshire, where they are incumbent on the chalk. Polypiferous remains and echinæ are of common occurrence amongst them."—(Kingston.)

turbed, and pieces of chalk-clay are mixed with the chert, flints, and sand, so as to give the idea of a passage bed, or the comingling of the two, the green sand and the chalk together.

BOVEY COAL, OR LIGNITE.—This formation, consisting of various layers of clay and coal, surmounted by a bed of gravel, illustrates and epitomizes the coal fields of Wales and the North of England. It occupies a large natural basin,* is of an irregular lozenge form, chiefly situated in the parishes of Bovey Tracey and Teigngrace, and extends itself in a narrow strip towards Teignbridge, and thence across the Teign, by Newton to Aller Mills, at the base of Milber Down. The length of this basin, from its north-western to its south-eastern extremity, is about eight miles, and its breadth, from its north-eastern to its south-western, about four miles.

The crowning bed of gravel, or "the head," as it is locally called, varies from five to twenty feet in depth, and is composed of quartzose sand, and portions of rock from the immediate neighbourhood, mingled with clay, apparently similar to that of the deposit beneath.

The clay is of different degrees of purity, consisting chiefly of what is technically called crackling, potter's, and pipe clay, and is deposited horizontally in five undulating beds of various widths: the two most westerly are the crackling, the two next or middle, the potter's, and the most easterly the pipe clay; this last lies considerably thicker than either of the others. These several layers of clay alternate with, and run parallel to, as many deposits of sand and gravel, which occur in beds of from fifty to a hundred feet in depth.

Both it and the intervening gravels are apparently formed of *débris* from the granite hills to the westward, the quartzose portion forming the gravels, and the decomposed felspar the clay. In the Bovey Basin the coarser materials are deposited while the

* The surface of this basin is known by the name of the Bovey Heathfield, and is at an average height of fifty feet above the low water sea level; near its south-eastern corner borings have been sunk through the layers of clay to the depth of two hundred and twenty feet, in an unsuccessful search for black coal.

fine clay has been carried further on towards Kingsteignton, and settled in, perhaps, more tranquil waters.

The deposit of lignite, evidently consists of dicotyledonous and other trees, imperfectly mineralized; it varies from charred wood to the more perfect structure of pit coal; it is brownish and black in colour, strongly impregnated with bitumen, light and friable in texture, and easily separable into irregular laminæ, especially after exposure to the air, when it becomes schistose in appearance: it occurs beneath the four layers of potter's and crackling clay in stratified beds. Near the Bovey pottery, where the largest body of it appears to be situated, it approaches to within five or six feet of the surface, and dips at an angle of about 24° or 25° . The coal is also found mingled with the clay in detached pieces, somewhat resembling reeds and grass. As mentioned above, it is fossiliferous, about forty different kinds of plants have been enumerated as occurring in it, but no indications of animal life.* Though the structure of the wood has been much altered by compression, yet much of it, by aid of the microscope, can be recognised as belonging to the *coniferæ*, and, according to Mr. Pengelly, to that section of this family,—the *Wellingtonia gigantea*, or some very nearly allied tree,—which is only met with in comparatively speaking a very small spot in California.

Amidst the clay, but adhering to the coal, small masses of retinasphaltum are occasionally met with; it is externally of a pale brown ochreous yellow and earthy appearance, but when broken exhibits a slight resinous lustre; is extremely light, soft, and easily frangible, the fracture is imperfectly conchoidal; it is inflammable, and during combustion emits an odour somewhat aromatic.

This coal pit, being an open one, may be studied in broad day; the average depth of the pit is eighty feet; at the higher, or north-west end, its depth is about a hundred feet. Here may be seen, at one view, all the seams of coal or lignite interstratified with quartz, sand, and clay. At this higher and deeper end, the seams of lignite, which are more numerous towards the

* Mr. Pengelly.

lower end of the pit, coalesce into one thick seam about fourteen feet thick. Into this an adit seven feet square has been driven for about twenty fathoms. This permits, especially where the roof has given way, the seam to be well studied. The trees, some apparently stumps only, forming this lignite are seen lying across each other in all sorts of ways.

A section of this lignite formation reveals the following order. Below the crowning bed of gravel there are five principal layers of loose lignite, alternating with layers of a granitic detritus and bouldered pebbles. The lowest bed of this series is a leaf bed, and contains the Flabelliform fossil. These layers of granitic detritus and lignite occupy a depth varying from twelve to thirty feet. Next in order is a ferruginous sand clay, nine feet thick, succeeded by ten beds of a more perfect lignite, alternating with blue clay, to the depth of one hundred feet. These layers of lignite contain seeds, and in the fourth bed are found the *Folliculites minutulus*, and masses of leafy matter, *sphenopteris latifolia*. The dip of the coal is eleven inches in the fathom.

This basin is now understood to belong to the Miocene, or middle tertiary period; the deposits that occupy it, though older than the gravels that surmount them, yet are evidently more recent than the neighbouring formations. The boundaries of the basin follow the general arrangement of the surrounding hill and dale, run up the valleys, and is even flanked by the green sand.

The clay, which has been worked for more than a hundred years, is used extensively, the potter's and crackling, according to their fineness, in the manufacture of porcelain and coarse earthenware, and the pipe clay, (which is unfit for the potteries, from the quantity of iron it contains,) in the making of tobacco pipes. It is worked in open pits of various depths, from thirty to forty feet, where it is cut into cubic or prismatic lumps weighing about thirty pounds each, technically called clay junks, it is then dried in cellars and exported.

The coal is to a certain extent serviceable for fuel, though its general adoption is precluded, not only from the imperfectness

and difficulty with which it burns, but from the offensive bituminous odour emitted during combustion. It is, however, occasionally used in the local potteries, and by the cottagers in the neighbourhood.

GRAVELS.—Overlying the strata already described are extensive deposits of waterworn materials, the *débris* of earlier formations.

On the top of Haldon we find flinty substances containing chalk fossils; many of these masses have their angles ground off, and others appear uninjured: with them also are rounded pebbles, composed of quartz, quartz with schorl or hornblende, hard silicious slate, trap, sandstones, chert from the green sand, and, mixed with the whole, whitish clay: this stratum has, by some geologists, been referred to the age of a part of the plastic clay series, which gives it an antiquity greater than that of the other gravels here mentioned.

The gravels from the Otter to the Teign appear to be derived from those rocks, over which the present rivers and their tributaries flow; near the Otter green sand chert is abundant; along the range of Woodbury hill, and some way to the west of it, pebbles of the new red sandstone are almost exclusively found; farther west these occur mixed with green sand chert; towards Exeter fragments of the carbonaceous and trap rocks are the most numerous; and in the valley of the Teign, granite, trap, and carbonaceous rocks are almost the only kinds to be noticed.

These gravels are all above the highest floods of the present streams, and must have been deposited by some cause not now in operation. We are not aware of any fossils having been discovered in them; for the marine shells said to have been found within the valley of the Exe cannot be so considered.

At lower levels, where the present waters may be supposed to have extended, deposits of gravel, sand, &c., are found. In one of these, where the Exeter harbour has been made, a portion of a large deer's horn was dug up.

The gravels afford useful materials for road-making, and they greatly assist in the drainage of the surface soil.

VALLEYS.—They are for the most part valleys of denudation, generally of the class called lowland, and do not form with their bounding hills undulations of any very considerable extent; those of rather greater depth are provincially styled “coombes.” An interest attaches to them, as being those from which Professors Playfair, De Luc, and Buckland deduced their opposing theories of the formation of valleys generally. The view of Dr. Buckland, which appears to be the correct one, is, that they were excavated by the denuding force of a transient deluge,* and which evidently took place subsequent to the period that the earth was inhabited by hyænas, bears, elephants, &c., whose remains have been found in Kent’s Hole,† and other caverns.

HYDROLOGY.—South Devon enjoys the advantages of rivers, streams, and springs in abundance. They all have their origin in the great watershed‡ that occupies the slopes of the inner sides of a large quadrangle, formed by a series of hills, which, rising from the sea to the westward at Salcombe, project northward to Cawsand, on Dartmoor, then north-eastward to Stoodley Beacon, above Tiverton, whence they enclose a narrow wedge of country to the north-westward, and then descend by the south-eastward to the sea at Salcombe-Regis. The rivers which arise from this vast watershed may, with the exception of the Clyst and the Culm, be classified as mountain streams, swelling rapidly after heavy rains, and as soon subsiding, but always pursuing a somewhat rapid course towards the ocean. The Clyst and the Culm are more sluggish.

The chemical character of these waters is necessarily in-

* Reliquiæ Diluvianæ, p. 238.

† *Vide antea*, p. 74.

‡ This watershed commences to the westward in the high lands, which, embracing Salcombe, coalesce at Morleigh, and then ascends northward by Boroughstone, Diptford, Shorter-cross, Marley, Gasper-down, Shipley Tor, Ryder’s Hill, and Holne Ridge, Anne Head, Fox Tor, Nun’s Cross, Tor Royal, Prince Town, Hollow Tor, Omen Beam, Great Mist Tor, Cut Hill, Little Kneeset, Dart Head (near to which point several rivers have their source,) Wild Tor, Hound Tor to Cawsand, thence the watershed passes to the north-east through Spreyton, Clannaborough, Coppelstone, Bagborough, Puddington, Gibbet’s Moor, to Stoodley Beacon; it then turns to the north-west, and goes by Bickham’s Moor, East Anstey, Anstey Hill, Molland Down to

fluenced by the geological formations from whence they arise, or through which they flow. The streams and river-waters are softer than those derived from springs, containing, after their sedimentary deposits have subsided, relatively a less amount of chemical ingredients. The former, for the most part, have a degree of hardness varying from 2° to 6° ; the springs from 10° to 55° ; hence, these latter are ill adapted for washing purposes. The water of the river Exe has 3° of hardness, and a stream from the granite only 2° . The spring waters sometimes, from sources very near to each other, differ remarkably in their degree of hardness. Thus water from neighbouring wells in the parish of St. Thomas, on the new red sandstone, has the one (Southeott's Inn) 12° ; another, (the National Schools) 26° . At Exmouth, also, on the new red sandstone, there is a difference, varying from 23° to 55° ; probably this latter is due to the infiltration of saline matters. At Ottery St. Mary, from 10° to 15° . On the carbonaceous rocks, at Tiverton, a difference is found of from 10° to 26° ; and on the Devonian at Newton Abbott, from 24° to 30° .

A brief notice of the general chemical characters of some few of the natural springs proper to the different geological formations is appended.

1. WATERS OF THE GRANITE FORMATION.—These are pure and soft, having a hardness varying from 10° to 26° . They contain ehloride of sodium in small quantity, a trace of chloride of magnesium, a trace of sulphates; no lime nor carbonic acid.

2. WATERS OF THE TRAP FORMATION.—The water of a well

Span Head, and Challacombe, by the south-east; then descends by Exe Head Hill, Dure Down, Pray-way, Black Barrow Down, Bendles Barrows, Blagden and Cutcombe to Watercombe, then, by Lype Hill and Cutcombe Barrow, joins the Brendon Hill range, thence descends on the south-east by Dun's-stone, Flint Cross, Heydon Down, Chipstaple, Weyhele to Clayhanger, thus enclosing the narrow strip of land whence rises the river Exe; the watershed then passes eastward by Staling Thorne, Hockworthy, Holcombe Rogus, Banger Hill, Nicholshayes to the Blackdown Hills. From Clecheydon, Churchstanton and Otterford, it passes southward by Brice Moor, Crow Moor, Devonshire Inn, Ruddick's Hill, Cotleigh, Mount Pleasant, above Honiton, Farway, Broad Down, Harcombe Hill, Salcombe Hill to the sea on the eastward.

in the cathedral yard is sparkling, clear, transparent, inodorous, and slightly styptic to the taste: specific gravity, 1003; temperature, 52° ; contains free carbonic acid, muriate of iron, muriate of lime, sulphate of lime, sulphate of alumina, carbonate of lime.

3. WATERS OF THE DEVONIAN SERIES.—The Victoria Spring,* at Plymouth, obtained from a boring 360 feet deep: temperature, 62° ; specific gravity, 1013.3; contains 8.1 cubic inches of carbonic acid gas in an imperial wine pint, and of dry salts—

	Grains.
Chloride of Sodium	96.64
Muriate of Magnesia	18.68
Muriate of Lime	15.10
Sulphate of Soda	9.55
Sulphate of Lime	8.94
Carbonate of Lime	2.06
Carbonate of Iron	0.69
	<hr/>
	151.66

4. WATERS OF THE CARBONACEOUS SERIES.—Springs at Cleve, Whitestone, and Perridge, though possessing certain general characters, differ somewhat in their composition; for the most part, their degree of hardness varies from 24° to 30° .

Cleve Spring, known in old times as “Gubb’s Well,” and esteemed as a chalybeate. Specific gravity, 1002; temperature, $51^{\circ}5'$; contains free carbonic acid, sulphate of iron, muriate of iron, carbonate of iron, sulphate of lime, sulphate of alumina.

Perridge Spring. Specific gravity, 1003; temperature, $52^{\circ}5'$; contains free carbonic acid, muriate of iron, sulphate of iron, carbonate of iron, sulphate of lime.

Whitestone Spring. Specific gravity, 1003; temperature, $52^{\circ}5'$; in its composition very similar to the preceding, excepting that the quantity of sulphate of lime is rather less.

5. WATERS OF THE NEW RED SANDSTONE.—Springs are frequent in this formation, and extensively used. The ancient conduit, which partly supplied the city of Exeter, and the supply to the Cathedral Close houses, were derived from springs in this formation. The water is particularly good, being clear,

* From an Analysis by Professor Daniel.

transparent, tasteless, and inodorous. Specific gravity, 1002; temperature, 53° , with a varying degree of hardness of from 10° to 25° ; contains free carbonic acid, muriate of lime, sulphate of lime, carbonate of lime, sulphate of alumina.

Parker's Well, formerly in estimation as a holy well, situated in the parish of St. Leonard, together with several others of the neighbourhood, do not essentially differ from the above, which may therefore be assumed to be the general character of the waters issuing from the new red sandstone. A spring, however, near Thorverton, presents some little difference, chiefly from containing a small quantity of soda; it is composed of carbonic acid, muriate of lime, muriate of soda, sulphate of alumina, sulphate of soda (a small quantity), sulphate of iron (a trace). A very deep well belonging to the Exeter Brewery, not far from the bed of the River Exe, yields a water of which a more particular analysis* gives the following results. In an imperial pint there are of—

	Grains.
Chloride of Magnesium—a trace.	
Soda, with a vegetable acid	0.44
Muriate of Soda	0.48
Sulphate of Soda	2.96
Carbonate of Magnesia	2.60
Sulphate of Lime	0.86
	<hr/>
	7.34

On taking a review of these waters, it will be seen that those which proceed from the trap and new red sandstone do not essentially differ, the characteristic impregnations of each being muriate and sulphate of lime, with a small portion of sulphate of alumina. The waters of the trap contain a little muriate of iron, which is not to be met with, or only a trace, in those of the new red sandstone; this is easily accounted for by the latter being a deposit from the *débris* of older rocks, which have been broken down and washed by diluvial waters, so that the iron has been precipitated as an insoluble oxide, imparting to the strata its ferruginous tint. The waters from the purer springs of these formations are clear, light, palatable, whole-

* From an analysis by Mr. Herapath, of Bristol.

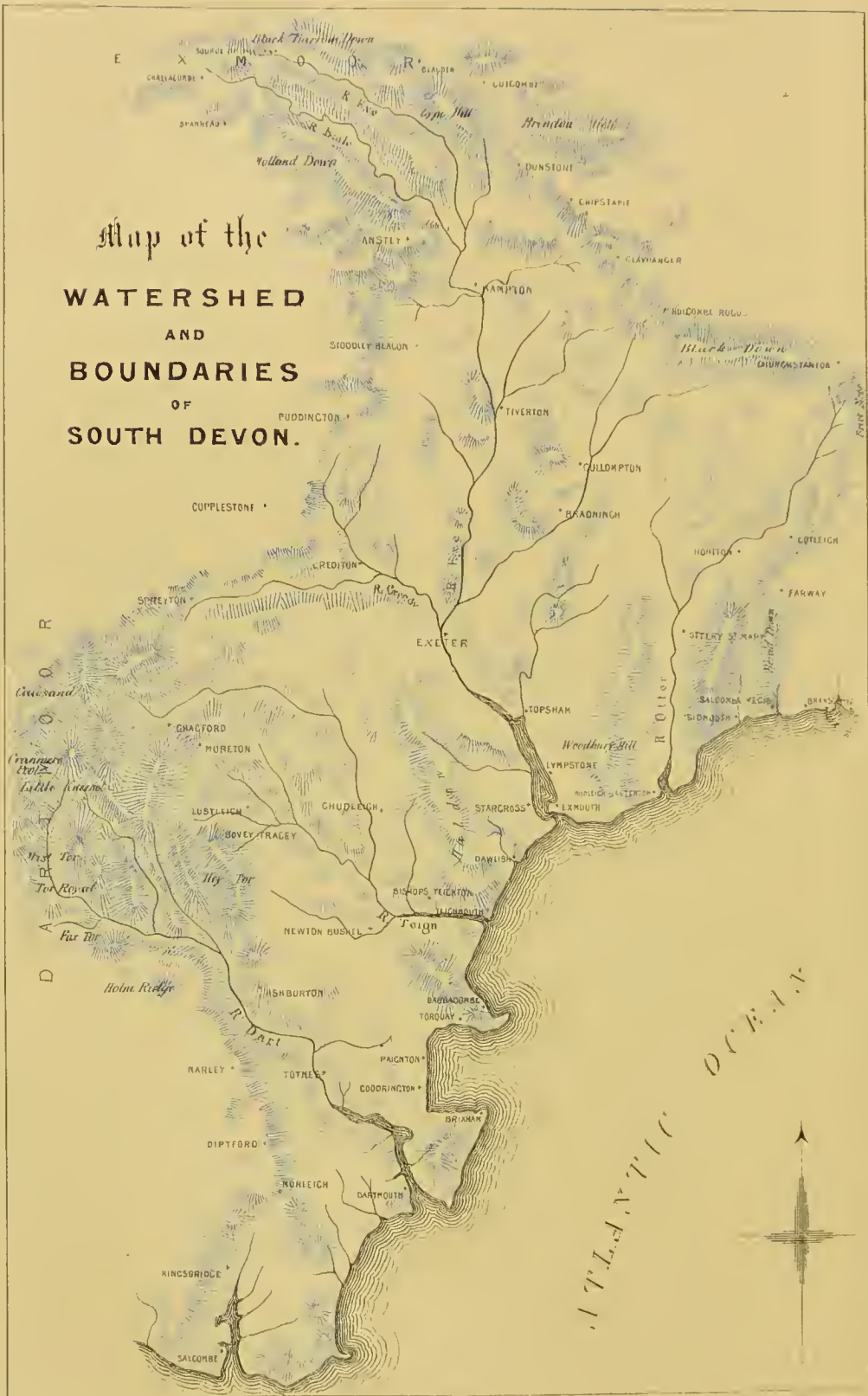
some, and generally available for domestic purposes; but when the mineral impregnations are in excess, as is often the case,* they are hard, cause roughness to the skin, and lie heavy on the stomach, often occasioning slight symptoms of a dyspeptic character. These effects are somewhat obviated by boiling; the water then deposits a large proportion of its solid contents. As is generally the case with waters that contain lime, they are well adapted for brewing and distillation; the fermentation of worts is better effected by them than by the soft waters, which prejudice, often at great expense, seeks for in preference.

The general character of the waters of the Devonian series is that of containing soda, magnesia, lime, and a trace of iron; that of the carbonaceous rocks of being clear, sparkling, inodorous, styptic to the taste, and usually depositing, after a few days' exposure to the air, a quantity of ferruginous matter. These, though inapplicable to many domestic purposes, are generally wholesome. Some of them, from containing an excess of free carbonic acid, and a very large proportion of iron, are entitled to be called mineral waters of the class of the acidulous chalybeate, and when drunk fresh are eminently serviceable in many cases of general debility and indigestion. The water from the granite is particularly fresh and clear; its chief distinctive characteristic is being free from lime and carbonic acid.

The temperature of the above springs, on being compared with that of the mean of the climate, will be observed to be a little higher: this slight excess appears to be general, throughout the temperate zone, whenever the springs proceed from some depth below the surface, and this may therefore be concluded to be the case with those of this district.

* A well, for instance, in Friernhay-street, Exeter.

Map of the WATERSHED AND BOUNDARIES OF SOUTH DEVON.



W. S. at L. H. Exeter

CHAPTER III.

THE PRINCIPAL INLAND AND SEACOAST TOWNS OF SOUTH DEVON.

It is proposed, in the present chapter, to make a few observations on those towns of South Devon which are usually resorted to in the pursuit of health; in doing so, those more prominent and individual characteristics which may modify the climate, or be interesting in a sanitary point of view, will be chiefly alluded to.

Before doing this, however, it will be useful to define what is to be understood by the south of Devon. In a previous page the great watershed of the county was described, as also those ridges of hill projecting southward, which bound the more limited watershed of the south of Devon, the one from Cranmeer pool on Dartmoor, through Kingsbridge to Salcombe; the other from Clayhanger, through Church Stanton and Honiton to Salcombe Regis. Arbitrary lines drawn from these points enclose an oblong quadrilateral space;* but arbitrary as these lines may be, they follow with very considerable accuracy the hill country which bounds and defines the south of Devon. Within the area thus enclosed, there is a perfect and exclusive watershed, a distinctive climate, a remarkable series of geological formations, with great variety of soil and surface.

The first prominent characteristic of this quadrilateral area, together with the horn of hill country that projects north-westward from its northern extremity and contains the source of the Exe, is, that the whole of the rain deposited within its boundaries falls inwards, and is ultimately collected and discharged

* In forming the railways through Devonshire, it was found difficult to enter this quadrilateral. The Bristol and Exeter Railway pierced it by the White Ball Tunnel; the Exeter and Yeovil by the Honiton Tunnel. Having got in, there was the same difficulty to get out; this was only done on the South Devon line by the Marley Tunnel, and on the North Devon line by surmounting with severe gradients the elevated ridge between Crediton and Copplestone.

into the Atlantic at the mouths of its rivers, the principal of which are the Dart, the Teign, the Exe, and the Otter, while the rain falling beyond its boundaries falls away from this space, and is discharged elsewhere.

The sea line of South Devon, stretching, by a curious coincidence of names, from Salcombe Regis to Saleombe, presents a south-eastern aspect, open to the sun and the sea breezes, while on the three other sides the whole area is sheltered by the elevated ridges of hill forming its watershed; and so marked is the effect of these protecting barriers, that universally, within them, vegetation is more luxuriant than immediately without. In the former, the green fields of Devon, with their park-like hedges, are at all seasons to be seen, while the trees are luxuriant with branches and full of leaf, and this even to the very edge of the sea. On the latter, herbage is scant, the trees are stunted, and on their south-western side stripped of wood and foliage, showing that on these elevated ridges vegetation suffers not only from the colder temperature proper to them, but from the violence of the south-westerly winds.

It has been shown (p. 47) that this protecting barrier of hill country likewise intercepted much of the vapour borne along with those humid winds, so that in South Devon the rain that is deposited is less by one-half than that which falls on its western boundary. The climate, the geological formations, and the soil of South Devon, have, however, been described in the previous pages.

In looking at the various localities within the area of South Devon, it will be at once seen that they are so situated—inland, on the seaboard, or in the moor country—as to offer qualities and conditions very different from each other. In order the better to estimate these peculiarities, it will be convenient to separate them into these three groups.

Of the inland places the chief is EXETER, the capital of the south-western peninsula of England, situated $50^{\circ} 45'$ north latitude, and $3^{\circ} 41'$ west longitude. It is a densely inhabited and compact city,* occupying the flat summit and declivities of

* Strictly speaking, Exeter must be described as standing within certain

a ridge-like hill, which rises gradually from the eastern bank of the river Exe to the average height of about 150 feet above the high-water level. This hill presents gentle declivities on its eastern and south-eastern sides, and abrupt steeps on its north and north-western sides.

The city, from its position, size, and importance, has justly been termed the "metropolis of the west." It is traversed by four cross streets, which, for the most part, contain the better shops for retail traffic; these streets divide it into four quarters. The western is occupied by the great mass of poor; one portion of which is situated on the steep declivity running westward towards the old town walls, thereby enjoying the advantages of sufficient drainage and ventilation; the other, the worst and most confined, is in a hollow flat at the foot of the declivity: the south-eastern quarter is inhabited by the resident gentry, and is in an open, pleasant, and healthful position: the remaining quarters, namely, the northern and southern, are occupied generally by persons, if not affluent, certainly for the most part in comfortable circumstances. About the centre of the town stands the ancient and noble cathedral.

From the elevated character of the ground upon which Exeter is built, great facilities for cleanliness and ventilation are afforded, notwithstanding the narrowness of some of the older ways. The system of drainage has latterly been much improved. A few years since the drains were merely surface gutters in the centre of the streets, necessarily the cause of much offensive unpleasantness; now, however, the city is drained most efficiently by an extensive series of sewers. These are deeply sunk through all the streets, and there is a local authority to oblige communication from every house; hence the city is remarkably free from the smells of close and foul air.

The river Exe, from which the city takes its name, is the great and important water of the south of Devon. It has

limits on the eastern side of the river, but it is ordinarily understood to include the large and populous parish of St. Thomas, situated on its western side, and immediately connected with the city by a conveniently built bridge, and the parishes of St. Leonard and Heavitree, which lie adjoining, on the south-eastern side.

its origin in the extensive moor district called Exmoor, from whence it flows through varied and beautiful country, and expands itself into a fine river at Tiverton; then winding through the romantic and wooded vale of Bickleigh, enters the district now under our notice. It flows over the new red sand formation, between the red rock of Thorverton and Silvertown, and between Bramfordspeke, and Netherex, and pursues its course over the schist to Exeter. Below the city, at the quay, it again flows upon a bed of new red sandstone, falls over many weirs, and passing through fertile meadows, reaches Topsham; then flowing between Lypston and Powderham, and over the bar at Exmouth, which is of red sandstone rock, and not of sea sand, as is generally supposed, empties itself into the English Channel, having from its rise to its mouth pursued rather a direct course of sixty miles, with a fall of one foot in four hundred and eight. The Exe receives several tributary rivers: the Creedy, the Culm, the Kenn, and the Clyst are within the immediate neighbourhood. The height of the river is affected by the tide to within a mile of Exeter, where any further influence is prevented by a weir. At the quay the breadth of the river is one hundred and twenty feet, and its depth averages rather more than nine: it is often flooded by continued heavy rains, when its waters come down greatly discoloured, especially after the junction of the Creedy, which rising near Cruwys Morchard, passes through the rich red country between Sandford and Upton Helions, and discharges itself, loaded with this soil, into the Exe, two miles above the city. These floods* during which the river seldom rises more

* 1800, Nov. 16.—A great flood caused by the melting of snow on Exmoor, together with 36 hours' rain. The waters rose 13 feet above the summer level of the river at Exeter.

1804, Nov. 24.—The Exe Island and St. Thomas's flooded.

1809, Jan. 24.—The Exe Island and St. Thomas's flooded.

1810, Nov. 10.—A great flood, 13 feet 3 inches above summer level.

1811, Jan. 24.—A great flood, 11 feet above summer level.

1818, March 5.—A flood with a gale of wind, the water a considerable depth in St. Thomas's.

1824, Nov. 23.—A great storm with high winds, much damage done on the coast—great flood.

1827, Oct. 9.—Water 6 feet above summer level.

than six or seven feet above its summer level, generally take place between November and March. On the 16th November, 1800, and on the 10th of November, 1810, however, the river rose between thirteen and fourteen feet; but excessive floods such as these are not likely to recur, as since their occurrence there is more water way for the tail water. The impurities by which the water is discoloured on these occasions are only suspended; its general character is that of being clear, soft, and pure. By analysis it is shown to contain muriate of lime, and a trace of iron; its taste, from a deficiency of fixed air, is somewhat flat, and consequently not pleasant as a drink; but for all domestic purposes it is perfectly unobjectionable. Its hardness is between 2° and 3°.

The inhabitants are abundantly supplied with good water from wells* of different degrees of hardness (*vide antea*, p. 97), and by water taken from the river two miles above the city. Of the works whereby this water is pumped into the city mention will be made in a subsequent page. The supply from the conduit is, alas! no more. When measured a few years since, it amounted in three minutes and fifty-two seconds to an

1827, Dec. 23.—Water 6 feet 2 inches above summer level.

1828, Jan. 13.—Water 6½ inches above summer level; violent storm. In July and August of this year the water was several inches higher than it had been during November and December.

1829, April, July, Aug., and Sept.—Water several times from 3 to 5 feet above summer level.

1830, Dec. 7.—Water 6 feet above summer level.

1831, Dec. 12.—6 feet 1 inch above summer level.

1832, Nov. 15.—7 feet 5 inches above summer level.

1833, Feb. 14.—5 feet above summer level.

1833, Feb. 15.—7 feet 2 inches above summer level.

1833, Feb. 20.—6 feet above summer level—violent storm; wind, west and north-west.

1833, Dec. 18.—6 feet above summer level.

1835, Nov. 4.—6 feet 4 inches above summer level.

1836, Nov. 28.—6 feet 7 inches above summer level—violent hurricane from half-past nine to ten; wind, west and north-west.

1838, Nov. 28.—8 feet 2 inches above summer level.

1838, Nov. 29.—9 feet 2 inches above summer level.

1841, Nov. 29.—9 feet above summer level.

1844, Feb. 23.—The height was 7 feet 6 inches above summer level.

1844, Nov. 13.—9 feet above summer level.

* For some account of the public wells of Exeter, *vide* "History of Cholera in Exeter," p. 91.

imperial hogshead of water. It was collected in stone reservoirs at its two sources—springs in the upper part of the parish of St. Sidwell (a third one immediately contiguous belonged to the chapter, and supplied the cathedral close)—and then transmitted by pipes into the city. Unfortunately the deep earth cuttings of the Exeter and Yeovil railroad have seriously damaged the springs belonging to the chapter, and entirely destroyed those of the city conduit.*

* Former times also had their grievances. Jenkins wrote more than a hundred years ago, that, “the great conduit at Carfoix, venerable for its antiquity, which had been standing nearly three hundred years, and had often poured wine to the rejoicing citizens, now fell a victim to modern improvements.” Some account of the conduit supply is given (p. 76) in the “History of Cholera in Exeter.” The following additional information is from a letter by the late Rev. Dr. Oliver:—

“It would afford me heartfelt pleasure if I could satisfy you and your numerous readers about the water course from St. Sidwell’s fee. The first mention that I have met with of it, is in a deed of *Serlo*, the first Dean of Exeter, between 1225 and 1231, by which he grants permission to the Priory of St. Nicholas to have a third of the water from that fountain or well. Within 120 years later, viz., 3rd May, 1346, the dean and chapter conveyed the stream to an inclosed building in St. Peter’s-yard, whence it branched off into three channels; one for the use of the members of the cathedral, another for the city, and a third for St. Nicholas’ Priory; the two latter paying for such accommodation 8s. per annum. Probably the supply of the city was found insufficient; for Simon Grendon, by his will, 1411, bequeathed £20 ad conductum aquæ de novo feodo (Qy. Brickfield) ad *quadrivium* civitatis Exon, provided it was completed within four years after his death, and William Wilsford bequeathed Butt Meadow and £10. This conduit in the middle of High-street, below the junction of the four streets, Quatrevoies (al. Carfoix), was taken down in 1770. In the fabric rolls of the cathedral of 1419-20, is found a collection presented to the church by the Mayor and citizens of Exeter, “pro emendatione Piparum Fontis Beati Petri Exon.” And these rolls for 1437 and 1438 set forth a considerable sum for stones for the wall made at Longbrooke for the safe keeping of the pipes.

“John de Donlys, by will, dated Tuesday, after the Feast of St. Luke (Oct.) 1267, had left for the repair and maintenance of St. Sidwell’s well one acre called Bromeaere, and half an acre called Stokislonde, which latter was about 45 feet from the well towards the north.”

William Wilsford’s will may be seen at the end of vol. i. of Bishop Stafford’s Register. It was made in June, 1413, and proved on 2nd October the same year. After desiring to be buried in Exeter cathedral, or its cemetery, as his executors may determine, he adds about the meadow, now called Bull Meadow, what follows:—

“Also I leave to my executors, my croft with its appurtenances in the suburb of the city of Exeter, beyond the south gate of the same city, for a water conduit to be made and maintained in the same city, at the discretion of my executors. Also I give and bequeath £10 towards making the water conduit in the city of Exeter.”

Thirty years since the markets of Exeter, celebrated for their profusion and cheapness, were held in the public streets. Twice in each week was the main thoroughfare thronged to obstruction by vendors and purchasers. These former, as a general course, sitting exposed to the weather from early morn till past midday; and many a time has the writer of these pages seen, in the inclemencies of winter, the stalls occupied the night previously, with no other shelter than the cloak and the umbrella. Fatal illness must have been often thus contracted. Nevertheless, the markets were then well supplied and well attended. But all this is now changed. The open market has given way to noble covered buildings. The other advantages do not correspond.

Exeter, besides its various ancient roads which facilitate communication with other parts of the kingdom, has become the local centre of a vast railway system; it is now approached by the iron road from all parts of the compass.

The neighbourhood abounds with very beautiful country, which is peculiar, from its extreme variety,—within only a short distance presenting the different aspects of moor, mountain, and woodland scenery. Its general character is that of a succession of small undulating hills, diversified by bolder swells, which, increasing in height* as they recede from the city, are even-

* HEIGHTS OF PLACES IN AND ABOUT EXETER, AND IN SOUTH DEVON.

The datum level adopted by the Ordnance Department for the survey of Great Britain is the level of the mean tide at Liverpool, as determined by the Ordnance observations, and is $\frac{8}{10}$ ths of an inch above the mean tidal level obtained from the records of the self-registering tide gauge at St. George's Pier, Liverpool. The following heights of places in and about Exeter have reference to the Ordnance datum.

	Feet.
Coping of first drawbridge on Exeter Canal	24·64
Centre of Alphington Street.....	24·22
Corner of St. Thomas' Street	25·69
Crown of Exe Bridge.....	41·59
Opposite Westgate	67·05
Opposite St. John's Church	115·50
St. David's Church.....	127·00
Ordnance Bench mark, Guildhall	136·53
Opposite Eastgate	150·22
Opposite New London Inn	149·15
St. Ann's Chapel.....	165·04
Mount Radford Turnpike Gate	84·00

tually lost in the elevated ranges which form its protecting boundaries; so that Exeter, though for the most part standing on high ground, is yet surrounded on every side, excepting to the south-east, where the broadly-expanded estuary of the Exe opens to the English Channel by a noble, though somewhat distant, amphitheatre of hills. The more prominent boundaries of the neighbourhood by land, are, to the south-west, Haldon, and at some distance beyond, the long line of Dartmoor; the former presenting a protecting barrier of more than eight hundred feet above the level of the sea, while the latter is an extensive mountain ridge, whose mean height is one thousand seven hundred and ninety-two feet, its highest point, Cawsand bog, being, according to the survey of General Mudge, upwards of two thousand and ninety feet. To the north are the Whitestone hills, which, from their proximity, and height of seven hundred and forty feet, form a screen of the most essential benefit; these, with an interval of less elevated ground, are irregularly con-

	Feet.
Ordnance Bench mark, Albert Terrace	117·55
Lowest part of Longbrook Street	107·26
Hill's Court	108·00
Hill's Court (higher side of South-western Railway Bridge)	130·00
Entrance to Swiss Cottages	178·00
Entrance to Union Road	197·24
Waterloo Cottage	316·62
Higher entrance to Pennsylvania ..	354·17
First Mile-stone, Pennsylvania Road	388·00
Highest part of the road at Marypole.....	437·49
Highest land at Marypole.....	449·00
Black Boy Turnpike Gate.....	290·30
Highest land on Stoke Hill	522·93
<hr/>	
Belvidere on Haldon	819·00
The summit of Whiteston Hill.....	663·00
Long Down End	597·00
Yestor	2000·00
Rippon Tor, Dartmoor	1549·00
Cawsand Beacon, Dartmoor.....	1792·00
Forland Hill, near Dartmouth	589·00
Charton Common, near Lyme Regis	582·00
Dumpdon Hill, near Honiton	879·00
Chapman Barrows, Exmoor	1540·00
Barrows, South end of North Molton ridge, Exmoor	1413·00
Span Head, Exmoor	1610·00

nected, by the Stoke range, to the Woodbury hills, which present themselves as the high lands to the eastward.

Situated on a natural terrace to the north of the city is the beautiful walk of the Northernhay, abounding with luxuriant elms and limes, which, rising considerably above the neighbouring houses, are seen from all directions, crowning them with a mass of dense foliage. Here, as in other elm plantations throughout Europe, that little insect, the *Scolytus destructor*, a few years since committed its ravages, and the premature decay of many of the trees took place. It has, however, been replanted. The city has also in some respects a peculiar appearance, from the planted and gardened spaces in front of some of the rows of houses, and from the general contiguity of trees in full and luxuriant foliage. This is not, however, so prominent a feature as was the case thirty years ago. It was then a defined city, situated in a grove of trees; now its boundaries have spread, and the trees around it are falling rapidly.

Exeter, from its somewhat elevated, yet sheltered situation, offers, as an inland place, many advantages to those seeking the south of Devon for health's sake. It combines on its slopes sheltered localities, with ridges of hill country where more bracing air can be enjoyed.

During the greater part of the year, that is to say, with the exception of July and August, it is an agreeable residence, and presents a climate which has the general characteristics of the district. During these two months it is somewhat close and relaxing. This would appear to be mainly due to the general condition of cities, where masses of houses congregated together intercept those light currents of air then prevailing, so that the heat, beyond that of the climate necessarily engendered by a large city, is not dissipated. When the atmosphere in the city, at this season, is close, heated, and relaxing, in the immediate suburbs it is cool and fresh; hence it may be inferred the former condition is much influenced by circumstances of local origin. Though some of the older streets are narrow, they are, on the whole, sufficiently wide, while in some parts the houses are laid out in "places" with the trees and grass before them. From the

nature of the ground, the distant hills are to be seen from many parts of the centre of the city. The pathways are well paved, and there are, besides, public airing grounds. It otherwise offers good accommodation for the casual visitant, and the general requisites for the invalid. As intimately connected with the medical history of the city, it may be observed that Exeter abounds in institutions devoted to the sick poor. Besides an excellent hospital attached to the city workhouse, there are the County Hospital, the Eye Infirmary, the Dispensary, the Lunatic Hospital, the Institution for the Deaf and Dumb, the Blind Asylum, the Leprosy Hospital, the Lying-in Charity, &c. &c.

The parish of ST. THOMAS, having partly a rural and partly a town population, is situated on the western side of the river; though flat and low, it has a fine gravelly soil. It does not, however, offer any special inducements to the stranger or invalid. The rain registered in this parish is somewhat more than that registered in Exeter, and at times the thermometer is some degrees lower, especially when dews or fogs prevail. On these occasions it is found there is a destruction to vegetation not observable in the higher ground round the city.

The parishes of HEAVITREE and ST. LEONARD, which bound the southern and eastern sides of Exeter, are situated on somewhat higher ground than the city itself, especially Heavitree. Their mean annual temperature is stated by Dr. Barham to be rather higher than that of the city.* The eastern side of Heavitree, from being on a ridge open to the north and south-east, has a fresh and comparatively bracing climate. The difference of the air on this ridge from that only a few feet below it on its south-western face is sometimes very striking.

The village of IDE, situated in a valley at the foot of a steep hill, about a mile and a half to the west of the city, is very much sheltered from the winds in general. Its climate must be rather warmer and more relaxing than that of Exeter. Each

* Heavitree, 51°·4; Exeter, 50°·7.

of these places afford convenient accommodation for the invalid, and together with Exeter, are, in the winter and spring seasons, very suitable to persons suffering from an irritable state of the lungs, and chronic bronchitic affections generally, as well as to those of a consumptive tendency. They are, in fact, generally beneficial in those cases for which the climate proper to the district is applicable.

To the southward of the city are the towns of Topsham and Lympstone. TOPSHAM, which is situated at the confluence of the Clyst and the Exe, was formerly a place of some local importance as the port of Exeter. Its houses remind one somewhat of a Flemish town. It faces the south-west, and has shelter from the east; its tidal breezes give it a fine open climate; fresh air may be obtained on its river front when elsewhere the atmosphere is still and close. It is a remarkably healthy town, and deserves to be better appreciated, than, from its unpretending aspect, it is likely to be; while its cheerful river view makes it a place well adapted for the recreative enjoyment of the work-worn citizen.

Topsham has been remarkably exempted from some of the occasional epidemics that have visited the kingdom. In 1832, it did not suffer from the cholera, and there are records of its exemption from plague in old times.

LYMPSTONE is a warm, sheltered, sunny spot, situated in a luxuriant valley running down to the river Exe, open to the west, and sheltered from the north and north-east. The more sheltered parts of Lympstone are probably as warm as any other part of the district; the houses are good and well situated. In the river contiguous to it are extensive oyster beds; the oyster and other small shell fishery occupy a large proportion of its population; it is the staple of the place.

STARCROSS, which is on the opposite side of the river, a little lower down, presents so extended and open a face to the estuary of the now expanded river as scarcely to come within the

category of an inland place. It enjoys a fine fresh tidal atmosphere. In the summer season, however, the air is sometimes tainted by the exhalations from the tidal mud; this only rarely occurs; it is otherwise an agreeable and healthy place.

The other inland towns which in point of population are important, as KINGSBRIDGE, TOTNES, NEWTON-ABBOTT, TIVERTON, CREDITON, CULLOMPTON, OTTERY, HONITON, &c., are agreeable and desirable places of residence, but do not here require particular mention; they partake of the general character of the climate. AXMINSTER and COLYTON, beyond the true limits of South Devon, are, from their contiguity to the Down country, colder and more bracing.

UPTON and WEST HILL, in the neighbourhood of Torquay; BISHOPSTEIGNTON, a few miles above Teignmouth; SALCOMBE REGIS, near Sidmouth, and BRANSCOMBE and AXMOUTH are small villages inland, but near to the seacoast, and may in some cases be preferred to the coast itself, especially when the advantages of sea air are desired without exposure to its immediate influence.

Of the moor towns little need be said, their chief attractions are the wild and beautiful scenery in which they are situated, and the freshness of their mountain climate. The climate of the moor is characterized by much moisture. There are few days in the year, save during summer, that some deposit of rain does not take place, and at all seasons there is a mistiness which is so penetrating that linen, though stored in cupboards, indicates the hygrometrical condition of the atmosphere. Snow falls early and lies long, and rains are so frequent and heavy that the amount deposited is greatly above that of South Devon generally (*Vide antea*, p. 51.)

The elevation of Dartmoor somewhat accounts for this, causing also the air, whose temperature is much below that of the contiguous low country, to be bleak and chilly, so that even in summer time, however hot and scorching the sun may have been during the day, a fire is agreeable in the early morning and evening. While the climate in the south of Devon may be said

to be mild and genial, interrupted only by short periods of wintry cold, on the moor it is the long continuance of wintry cold that is interrupted by short periods of summer heat. Nevertheless, Dartmoor has a mountain air, and, during the summer and autumn seasons, is much resorted to for its invigorating and enjoyable breezes. It has then a salubrity which in many cases of exhaustion and debility is of the greatest use.

MORETON is a small market town situated on the eastern side of the moor. It is built on a ridge-like hill, surrounded on all sides but the west by hills much higher, so that it is somewhat sheltered from some of the occasional asperities of the moor climate. CHAGFORD is also a small market town, situated in an expanded vale. Latterly Chagford has been a favourite resort for those desirous of enjoying the moor air. LUSTLEIGH is a small village, and offers but little accommodation for the casual visitor; it is the centre of very beautiful scenery; these places are all on the granite.

The elevated ridge of HALDON partakes to a lesser extent of the moor climate; it is, however, neither so bleak nor humid. It is to be regretted that more attention has not been directed to the many beautiful spots upon the sunny slopes of Haldon. They afford a combination of the mild with the fresh climate of the district, which might be of great use as summer retreats, or where a bracing air is required.

SOUTH BOVEY and CHUDLEIGH, situated between Haldon and Dartmoor, present many advantages in these respects, the latter especially. It is a beautifully situated place, and offers much accommodation for the occasional visitor. Between Chudleigh and the moor is the Bovey Heathfield (*vide antea*, p. 90), a low flat land, perhaps the lowest in Devonshire. On its eastern verge, is situated BOVEY TRACEY; it is a small town built upon the slopes of a hill, with a south aspect, and is distant some ten miles from the sea. Its position is remarkable. Encircled on the west by carbonaceous rocks and the granite of Dartmoor,

on the south by Devonian lime rocks, on the south-east by the red sandstone, on the east by the green sand of Haldon, on the north-east by carbonaceous rocks, and on the north by trappean rocks, it comprises within an area of a dozen miles a geological world in miniature.

The situation conduces to much mildness and fertility ; Cape and Australian plants are acclimated ; frost and snow occur but seldom, nor continue many days. The flat surface of Bovey Heathfield and the low lands stretching away to Kingsteignton were formerly covered with stagnant pools of water, and in the direction of the peat bogs the *ignis fatuus* was often seen flitting over the plain. The inhabitants within the area of the fogs and exhalations were then much afflicted with ague. A canal which was made here about sixty years ago has effectually drained this district, and the ague and the Jack-o'-lantern have entirely disappeared ; its contiguity to the great clay deposit is, nevertheless, in some respects an objection to South Bovey, as is also the occasional smoke from the numerous fires of lignite ; the smell emitted by these is often oppressive and offensive.

The WOODBURY range of hills, in the eastern division of South Devon, is beautifully situated as regards scenery and climate, offering that which is clear and fresh. It is but scantily populated, and no other accommodation is offered than that afforded by a few farm-houses.

The seacoast of this district presents two aspects, one facing the south, the other the east, the estuary of the Exe being at the apex of the angle thus formed. On this seaboard, and at no great distance from each other, are situated the watering-places of the south of Devon.

SALCOMBE, geographically the most southern point of Devonshire, is at the extreme west of South Devon. Though situated on an arm of the sea, it is much sheltered, being land-locked by high and steep hills. It is open to the south only, and probably offers the mildest and most genial climate in the country, espe-

cially that portion of it which stretches southward from the town to the Bolthead. Its mildness was appreciated in former times, and Huxham styled it the "Montpelier" of England. The character of its vegetation is almost Italian; with but slight winter protection, orange, lemon, and lime-trees grow in the open air, and the aloe has freely flowered. It is a situation well adapted for those of tender chest, especially in the winter and spring seasons. Being situated on the side of a hill descending to the sea, the extent of level ground is very limited, so that its capabilities for walking exercise are far from great. It is, otherwise, much shut in by the steepness of its hills. These are the chief objections to Salcombe as a residence for the invalid. It, moreover, affords to the casual visitor but little house accommodation.

DARTMOUTH, though on the western side of the river Dart, may yet be said to be on an arm of the sea. The headlands, which form the mouth of the harbour, alone land-lock it and shut it out from the main ocean. The town itself, one of the most interesting in the west of England, faces the east, but the opposite shore rises sufficiently high to form a protection from the severity of the winds from this quarter. It is more obnoxious to the north-east and north winds, which blow down the gorges of the channel of the river.

BRIXHAM, the great fishing station of the west of England,* is a long, straggling place, facing the north. Situated on the shores of Torbay, it enjoys the same general mild climate common to it and the neighbouring places. The old part of the

* "Brixham is said to be the largest fishery in England. More than two hundred sail of vessels, comprising 20,000 tons of shipping, and employing 1,500 seamen, belong to this town, which is within the port of Dartmouth, the chief part of them engaged in the fishing trade. We understand the average amount received for fish is £600 per week. The prime fish is always taken off to Exeter, Bath, Bristol, and London markets. We are told the average cost for carriage alone is £1,000 per annum. A more interesting sight is scarcely to be seen than the quay of Brixham, of an evening, after a large catch, when heaps of fish, comprising turbot, soles, whiting, plaice, mullet, mackerel, gurnet, flounders, and other kinds, are piled up, and a sort of Dutch auction takes place."—*Besley's Route Book of Devon*.

town is interesting, as belonging to a state of things which is now gone by. The newer portion is open and commodious.

PAIGNTON and GOODRINGTON are situated on the extended flat that lies between Brixham and Torquay. They lie low, and are open to the east; have fine sands, affording every facility for good sea bathing, and are generally agreeable localities, especially during the late summer and autumn months: they are not favourable residences for the spring season. Paignton is becoming a large and important place, and offers every accommodation to the visitor.

TORQUAY has for many years been celebrated as a suitable winter residence for persons requiring a mild, warm climate. Its local advantages have been largely set forth and duly appreciated. Torquay proper is situated in a cove at the north-west angle of Torbay, to the eastward of Exeter. This cove is surrounded by three hills, "nearly equal in elevation (180 to 200 feet), and similar in general features. Between them run two tortuous valleys, one towards the east, the other towards the north. It is on the shores of the cove, along the slopes of the hills, and in the gorges of the valleys, that the town is built." It faces the south-west, and is sheltered from the north and east. Torquay presents the appearance of a number of rising terraces, which, receiving the direct rays of the sun unchilled by the colder winds, form safe and pleasant walks for the invalid. The scenery from these terraces is peculiarly beautiful; immediately beneath is expanded the bay, like a small inland sea, on every side bounded to the view by wooded heights. Embedded on these heights are luxurious villa residences, princely in internal accommodation, with each its portion of shrubbed pleasure-ground.*

* The description of Torquay, by Dr. Radcliffe Hall (*vide* "Torquay in its Medical Aspect," p. 26), is comprehensive and illustrative. He states it to be "situated on a small imperfect peninsula, having a wide base landward to the north, and bounded by the English Channel on the east and south-east, by Torbay on the south and south-west. On the west, Torquay and the neighbouring district are separated from the Atlantic by the breadth of Devon and of a portion of Cornwall. The elevated range of Dartmoor, running almost

Torquay is a remarkable locality as regards soil. One portion is on slate, another on limestone, immediately surrounded by

through the centre of the county from north-east to south-west, extends for about twenty-two miles in length by twenty miles in width, and forms at once a natural division between North and South Devon, and a permanent barrier to the latter against the full violence of the westerly and north-westerly gales. This forms the first great outer defence of Torquay. Proceeding by the coast from Torquay to Teignmouth, rather more than midway commences the range of elevated ground which constitutes the second great outer screen. Curving irregularly from the sea on the east, it forms the beautiful ridge of Barton Cross, and dipping in a narrow valley, where the Newton-road passes King's Kerswell, immediately juts upwards again in Kerswell Down. From this point, a general semicircle of high ground trends along by the outside of Tor, Cockington, Paignton, and Brixham, to Berryhead, forming the horizon boundary which is seen from the hills of Torquay for about twenty miles, coursing from east by north and west, to south. Taking the Windmill Hill as the nearest point of the top of this range to Torquay, it is here distant from three to four miles. Torquay is thus embraced on all sides, excepting the east and south, by a range of elevated ground at some distance. Its defence from the east lies nearer.

“What may be termed the three hills of Torquay, *par excellence*, slope towards each other, and towards the bay. The central and northern one is called the Braddons at its front and lesser elevation, the Warberry at its second and greater height. The eastern hill is named Park Hill towards the bay, Silver Hill towards the Meadfoot-road. The western hill is the Waldron, or Warren Hill. Between, and at the foot of, these three hills, lies the quay, or harbour of Torre, the original Torquay. Torbay here forms a little secondary bay, extending from the Livermead promontory on the west, to the projection of the Daddy-hole rocks on the east. Thus Torquay is placed on a peninsula belonging to the larger peninsula of the south-western counties, and in a small secondary bay belonging to the larger Torbay. It thereby obtains many of the climatic advantages, without any of the inconveniences of an insular position. The Torbay aspect of the Warberry Hill is slightly west of south. Warren Hill has a south aspect towards the bay, and an eastern one towards the town. Silver Hill looks westward over the town and bay. Beyond Silver Hill is situated the beautiful district of Meadfoot, which is defended from the east and north-east by the extensive range of cliff which stretches along the channel from Petit Tor by Babbicombe to Hope's Nose—the northern horn of Torbay. Lofty hills back it up to the north, and thus complete its defence on the east, north, and west, whilst it is defended from the south-westerly winds by the plantations and plains of Daddyhole. It is open to the sea on the south and south-east.

“On the table land north of Babbicombe lies the large village of St. Mary Church, now rapidly becoming joined to Torquay. Mary Church is separated from Torquay by the large central hill—the Warberry. The base of this hill, on its north-western aspect, is distant about a mile, or rather more, from Mary Church. Towards it, from the high ground on which Mary Church is built, the land gently slopes, forming a broad incline, looking south towards the back of the Warberry, and towards the pretty rocky valley of Ellacombe. This gently sloping plain is defended on the east, south-east, and west; but, owing to the break in the distant range of hill where it lies, north-west of Torquay, there is no elevated ground on the north-west between this and Dartmoor, distant, if

red sandstones and conglomerates.* (*Vide antea*, p. 73.) Its climate is very varied—the lower portion being warm and sheltered, while on the heights the air is fresh, cold, and bracing. Mr. Vivian has, through a long series of years, noted the peculiarities of its climate, and he sums them up† by stating that Torquay has a mean annual temperature higher than any other place in Great Britain or Ireland, and that this higher temperature is chiefly experienced in the winter months; the summers being cool in the same proportion as the winters are warm, the climate is more equable than in most other places; that the rain which is deposited is two inches less than the average of England, and that the number of days, in which this falls, is fewer.

Though the lower parts of Torquay are not deficient in wells, yet the town, from its size, requires mainly to be supplied with water procured from a distance. Until two years ago, this foreign supply was limited to two springs—one at Tor, the other near the summit of Braddon Hill. These waters, conveyed from the above sources through iron pipes, are clear and sparkling, strongly impregnated with lime, and containing some little iron; their temperature at the fountain-head is about 52°; they may be considered agreeable and wholesome, but too hard for many domestic purposes. The supply from these

we take the beautiful and conspicuous Hey Tor to represent the margin of the moor, about fifteen miles. The Warberry Hill obstructs the blow of the sea-breeze from the east and south-east. Owing to the free admixture of the air from Dartmoor with that of Torbay, to the partial barrier placed by the Warberry Hill against the full ingress of the latter, and to the absence of any rocks or steep hills sufficiently near to radiate heat upon the houses, the high ground on the Mary Church-road is far the most bracing of any part of the neighbourhood of Torquay. Indeed, during the prevalence of the only land-wind which Torquay obtains—namely, the north wind—visitors from a distance always pronounce the air here to be not only comparatively, but positively, very bracing.

“After this, the most bracing situation is the higher part of Torre; then the western edge of the Warberry Hill; then Meadfoot, and its neighbourhood; lastly, Torquay within the hills, which, excepting during the occasional prevalence of northerly winds, is the reverse of bracing.”

* Mr. Pengelly, of Torquay, has exhausted the subject of the geology of Torquay. Those interested in this subject cannot fail to be satisfied with the information communicated in the various papers published by him.

† “Climate of Torquay,” p. 12.

sources proved, however, much too small for the rapidly increasing town and neighbourhood ; but all inconvenience on this score is at an end. Torquay is now amply supplied by a pure soft water, derived from the Hennock Hills, sixteen miles distant, on the borders of Dartmoor. This water is soft, having only 2° of hardness, contains a small quantity of sodium, a trace of chloride of magnesium, and a trace of sulphates ; no lime nor carbonic acid.*

Torquay offers but little sea-shore, save the cliffs, whose precipitous sides are washed by the sea ; hence the usual facilities for open sea bathing are but limited. The place resorted to is a small cove, with a southerly aspect, remarkably well sheltered, but on a shingly beach. The conveniences of this bathing-place have latterly been much enlarged by removing some of the surrounding cliff. A more pleasant bathing-place is the sandy beach of Livermead, situated about a mile to the north-west of the town.

Torquay enjoys the advantages of a rich and cultivated neighbourhood, abounding in sheltered and accessible drives, through the most varied and beautiful scenery ; and offers to the casual visitant the usual advantages of towns of this description. During the summer months the lower district is not so pleasant a residence as many on the coast, from the warmth and closeness of the air, with the further drawback of the occasional smell emanating from the mud of the harbour, which is left exposed at every retiring of the tide ; the effluvium from this, when a hot sun rests upon it, is often most offensive.

Torquay is peculiarly suitable, during the winter, to persons labouring under chest complaints generally. Those far advanced in diseases of the lungs here pass their time more easily to themselves, and freer from the harassing effects of cough and febrile irritation ; while those in the early threatening of disease may not unfrequently date a permanent re-establishment of health to a residence in its mild climate.

BABBICOMBE is a small cove to the north-east of, and con-

* For an account of the works connected with this supply, *vide postea*, chapter on Civil and Economical History.

iguous to, Torquay. The houses are built on the steep sides of a hill descending to the sea, which effectually shelters Babbicombe from the heats of summer and the boisterous south and south-westerly winds of autumn. It is open to the north and north-east. In winter and spring it is a cold, bleak place, but in summer it is a most delightful residence. This cove, whose massive rocks and thickly-planted grounds constitute a scene as romantic as it is picturesque, is the property of a few persons, who for the most part inhabit it themselves. On the summit of the hill there is ample accommodation for strangers; but here the peculiarities of the climate of the cove are lost. Between Babbicombe and Torbay there is a bone cavern, well worthy the attention of the curious. (*Vide antea*, p. 74.)

TEIGNMOUTH is situated about fifteen miles to the south of Exeter, partly upon a flat tongue of land projecting between the estuary of the river Teign and the sea, and partly upon the sides of the high and steep hills, and in the coombes formed in them, which bound it from the north-east round to the north-west. That portion of Teignmouth which faces the sea is open to the east and the south, so that in the spring it is a bleak situation, and in the summer, from a deficiency of shade, somewhat hot. The other portions in the coombes and the sides of the hill running down to the south are warm and sheltered. Dr. Lake, who has reported on the sanitary state of Teignmouth,* says "the several parts of the town present more features of difference, with regard to climatic character, than might have been expected from its comparatively limited size. The part situated on the flat, and which contains a principal portion of the better class of houses for residents, and almost all the lodging-houses, faces, generally speaking, south-east, and is a good deal exposed to easterly winds, though forming a delightful place of summer residence. The part on the rising ground between the vales faces nearly south, has the advantage of a more elevated situation than the first part, and is more sheltered by the hills rising to the north of the town, and which, at a distance of two miles

* *Vide* "Richardson's Sanitary Review," October, 1857.

from it, attain an elevation of from 500 to 600 feet. It is less exposed to the east wind, and is mostly occupied by houses belonging to the poorer classes, though containing also some of the better class of houses, and a few of the lodging-houses. The sides of the valleys which combine the advantages of elevation to a greater or less degree, and on one side at least complete shelter from easterly winds, and are well fitted for a place of winter resort, are at present occupied by a comparatively small portion of the town, consisting chiefly of gentlemen's seats and villa residences, with a few of the houses of the labouring population. It is, however, in the direction of these valleys that the town is now extending."

The climate of Teignmouth partakes of the general equability of the district. The west, south-west, and north-west are the prevailing winds for about ten months in the year: the two former particularly in the autumn; the east and south-east chiefly blow during March and April; the north-east is comparatively a rare wind. From its contiguity to Haldon, showers are more frequent, and somewhat more rain falls than in some other parts of the district.

The country in the neighbourhood is very varied; near the sea the walks are open and accessible; inland, and more immediately adjoining the town, they are wooded and sheltered; the banks of the river abound in beautiful views; and Haldon affords moor-like scenery, vast range of prospect, and bracing air. In the lower portion of the town, which is only a few feet above the level of the sea, the substratum is a recent deposit of sand, so that the sea water finds its way into the wells, more especially at the spring tides, and renders them brackish: in the upper part of the town, which is situated on the red sandstone, good water is found, but not in quantity sufficient to afford an adequate supply. To obviate this serious inconvenience, water has been introduced from springs which rise from the lower beds of the green sand formation, on the southern side of Haldon,* and pass over the beds of clay beneath the same at an elevation of from four hundred and twenty to five hundred feet

* Immediately above a farm called Lower Venn.

above the level of the sea. This water, which is exceedingly good and pure, is collected in a small reservoir of stone and cement, one hundred and fifty-three feet above the level of the sea, near the village of Coombe; from this the main pipe conveys the water into a larger reservoir,* containing six thousand hogsheads, in the immediate vicinity of Teignmouth, which affords to the town an ample supply both night and day.

The beach, which is open and unsheltered, affords good sea-bathing, available at all times of the tide; the sands are perhaps better than on any beach upon the coast. There are hot, cold, vapour, and medicated baths, which are conveniently situated and well appointed. As a place of sojourn for the invalid, Teignmouth can be recommended from the beginning of June to the end of October: it is not so favourable during the remainder of the year, and in the spring is decidedly ill adapted to persons with weakly constitutions.

To those visiting it, in the summer and autumn seasons, the houses on the Den and more elevated portions of the western division of the town can be recommended; the low western portion adjoining the river is not favourably situated, being exposed to the exhalations from the vast surface of mud laid bare at the retiring of the tide, and to the currents of air rushing up and down the valley.

Teignmouth is a pleasant place of residence, and, from its size and situation, presents many advantages to the stranger and the invalid. It is spoken of as remarkable for numerous instances of longevity, and for being particularly exempted from epidemics, or serious prevalence of fever. It seems very well adapted for restoring the health and strength of those who may

* Mr. J. B. West, under whose direction the works were completed, informs me that the water is carried from the large reservoir through the town by iron pipes or mains, each main having an auxiliary or smaller main, by its side, with a cock to each auxiliary. The houses are supplied from the auxiliary pipes, so that in case of a fire all the auxiliary cocks would be shut, and the whole pressure of the reservoir, which is a hundred and twenty feet and upwards above the lower part of the town, would be brought into effect, and by fixing a stand-pipe and hose in one of the fire-plugs, with which the town is abundantly supplied, water can be thrown with the greatest force over the highest house in the lower part of the town by its own pressure, and thereby saving the use of a fire-engine.

have suffered from the climates of the East or West Indies, and from the depressing effects of inflammatory dyspepsia.

Opposite to Teignmouth is SHALDON. It is a cool resort in summer, and then enjoys a shade which is not to be found in much of Teignmouth; its tidal breezes make the air fresh and invigorating.

DAWLISH is a small and pleasantly-situated watering-place, about twelve miles from Exeter, chiefly occupying a narrow valley which opens to the sea towards the east. It is bounded on either side by the steep slopes of the hills, and possesses an air of cheerful seclusion and quiet, which the railway that passes between it and the sea scarcely disturbs. It is of greater size than its first appearance indicates, extending to some distance up the valley, and almost in continuance with the small hamlet called Dawlish Water, whose name is derived from the little stream which passes through it. This stream, which forms a cheerful object as it gurgles through the town, is clear and flowing, and finds its way to the sea, over and beneath the pebbles of the beach.

Though Dawlish is for the most part inhabited by permanent residents, yet it contains good accommodation for the occasional visitant; the houses are situated, some upon a terrace walk, near to and facing the sea, some upon the western hill, and others in the valley itself; the two former situations may be recommended during the summer and autumn seasons, the last during the winter and spring, being protected from the north, as also from the south-westerly winds. DAWLISH WATER is singularly well sheltered, and enjoys as mild a climate as can be found in the county.

The nature of the coast renders the sea-bathing good and convenient, the sands forming a safe and easy footing, and the adjoining cliffs giving adequate protection against the colder winds. The walks and drives in the immediate neighbourhood, especially up the valley, are pleasant and accessible, and the nearness of Haldon offers every facility for the enjoyment of the fresh breezes ever to be found upon its heights.

The climate of Dawlish is warmer than that of Exeter, and even, perhaps, than that of Torquay. During the autumn and winter months there can be no place upon this coast better adapted as a residence for those suffering under pulmonary disease, so entirely is it protected from the prevailing winds of these seasons: this is more particularly the case with the little hamlet of Dawlish Water. During the spring months, however, Dawlish must be regarded as not a very favourable residence for patients of the above description, chiefly on account of the east winds which then prevail, and to which, from its aspect, it is peculiarly exposed.

EXMOUTH is situated about nine miles from Exeter, on the eastern side of the estuary of the river Exe. The mouth of this river, which extends to a breadth of two miles, is much obstructed by two shoals of sand, called poles, of unequal breadth, and advancing in parallel directions; from not being connected they have merely the effect of narrowing the channel, and not of lessening its depth. The greater mass of the sand bank, on the western side of the river, called the Warren, is now raised above high water level, through the agency of the sea matweed (*arundo arenaria*), which has retained the sand carried by the south wind. The old portion of the town is built upon low ground, looking north-west, and having rather a river aspect; another portion occupies the summit of a hill, called the Beacon, facing the sea or the estuary of the river towards the south-west, and a third or more recent portion the high ground to the eastward. The view of the opposite coast from this hill is peculiarly striking; immediately beneath are seen the above-mentioned extensive shoals of sand, whose circling banks are partially washed by the river and the sea; beyond these are the wooded hills intervening between the opposite shore and Haldon; and gradually receding into the distance are the various headlands, which secrete behind them the several sea-coast towns already described. At high water the river scene is very beautiful, the banks on either side being wooded to the water's edge; but at low water it is greatly detracted from by the

extensive surface of mud then laid bare. The exhalations from this mud are at times somewhat offensive to the small portion of the town which lies contiguous to the river; the greater portion, however, is sufficiently distant to prevent any very sensible effects from it, and the houses on and adjoining the Beacon are entirely beyond its influence.

The face of the Beacon cliff is planted with trees (certainly not an improvement) and evergreens, and cut into zigzag walks, leading to the sands below, which are not very firm, and approached through a quantity of loose dry sand, exceedingly fatiguing to traverse. Below this cliff, and between it and the sea, is a wide and extensive terrace drive, reclaimed from the sandy beach by a noble sea-wall.* The cliff at the east of the town, fronting the sea, arches round into a semicircle, protecting a considerable portion of dry sandy ground from the north and easterly winds, thus affording, during their prevalence, warm and pleasant airing grounds; the sea and land views from this spot are particularly fine.

The immediate neighbourhood abounds in wooded lanes and path-fields, and at a short distance the open downs of the Woodbury Hills offer an eligible district for horse and carriage exercise. In consequence of the protective power of the warren and of the bar, water excursions are much more attainable than in most other places upon the coast.

Notwithstanding the south-westerly aspect of Exmouth, it offers a more bracing climate than any of the watering-places hitherto described. Though somewhat sheltered from the easterly winds by the high lands of Littleham and Orcomb-point, and from the north-east by the Woodbury range, it is yet generally open, so that its climate partakes of the general character of the district, modified by its contiguity to the sea. Being open to the south-west, it at times suffers severely from the north-westerly gales, which blow immediately into it; but as the winds from this quarter are not accompanied by a low or

* The dimensions of the sea-wall, which is of limestone, was originally in length 1,800 feet, height 22 feet to the coping, and secured by a row of sheet piling 10 feet long. It has since been extended, westward, on a different plan.

inclement temperature, no other inconvenience is experienced than such as may be caused by the force with which they blow. The winds which are the most trying and blighting are the north and north-westerly, and not the easterly, as is more usual on the coast.

With the exception of an occasional sea-fog after the heat of a summer's day, it is free from mists and damp vapours; and, in common with Budleigh Salterton, is less liable to rain than other places in the neighbourhood. Rain clouds from the Atlantic are frequently seen coming as it were straight towards it, but, influenced by the high lands to the northward from Berryhead to Haldon, sweep by, discharging themselves in the interior of the country.

Exmouth contains houses of every kind, which are available for the occasional visitant; those on the Beacon, Louisa and Trefusis terraces and on the Sidmouth road are in very eligible situations. It is unequally supplied with water. The springs in this higher district are clear, fresh, and good, but very hard. In the lower part of the town, there being a stratum of sand permeable to the sea, overlying the sandstone rock, the springs issuing from it are flat and brackish; to supply this deficiency, water has been brought in from the higher country to the north-east: it is, however, somewhat hard;* a well recently sunk on the seashore in front of the custom-house affords a clear, good water, free from brine. An objection has been made to the sea-bathing, in consequence of the large dilution of fresh water which is occasioned by the flowing of the river: there can be no doubt that this may somewhat influence it, but not so seriously as to impair its usefulness; at any rate, any such

Waters taken from							Degrees of Hardness.
Pump in strand	.	.	.	.	.	.	55·
Well, South Town	.	.	.	.	.	.	28·32
Well, Beacon Hotel	.	.	.	.	.	.	24·76
Well, Marine Hotel	.	.	.	.	.	.	23·
Company's reservoir	.	.	.	.	.	.	16·
Withycombe Brook	.	.	.	.	.	.	19·50
Littleham Brook	.	.	.	.	.	.	17·
Sherbrook Lake spring, near Budleigh Salterton	.	.	.	.	.	.	2
Fishpond, near Bystock	.	.	.	.	.	.	1·40

objection is superseded on the rising of the tide. To the sea-bather some advantage is occasionally gained by the position of the bar and pole sand, which often render the surface of the sea calm when it is rough elsewhere—a condition of the greatest consequence to nervous people.

From its aspect and open situation, Exmouth presents no great objections as a residence at any season of the year. It will be found particularly serviceable as a resort for weakly children, and those of a scrofulous constitution, and where change is required in the debility consequent upon attacks of fever, or during convalescence after other diseases. It offers also a very fit residence for those suffering from an irritable indigestion, catarrhal affections, or more especially the dry asthma, which experience has often shown to be greatly benefited by it. Its exposed situation renders it inapplicable in the severer affections of the chest, and particularly in cases where there is a tendency to hæmorrhage or inflammation of the lungs, as also where consumption has been fully developed. It is not suitable to rheumatic complaints; those liable to such affections invariably suffer. Female derangements are benefited by a residence in the higher part of the town, but in the lower there is too great a tendency to produce relaxation. That portion facing the river, and looking northwards, is in many respects badly situated.

In a sheltered valley, about a mile to the north of Exmouth, is the very picturesque village of WITHEYCOMBE; it is well adapted for persons in the severer forms of pectoral disease, or the more advanced stages of consumption, but its moist atmosphere and extreme verdure render it unfavourable in cases dependent upon a relaxed constitution. Notwithstanding the short distance of this village from Exmouth, the most marked difference exists between their climates. The accommodation for strangers is very limited.

BUDLEIGH SALTERTON is pleasantly situated, about three miles and a half from Exmouth, in a valley facing the sea towards the south-east; to the winds from this quarter it is exposed, but is

tolerably well protected in all other directions. It offers, with much freshness, a warm and genial climate, and, in common with Exmouth, is less liable to rain than other places upon the coast. The sea-bathing, though fresh and open, is not particularly good, from the total absence of sand, the shore consisting of a mass of large-sized water-worn pebbles,* which are heaped up in a steep acclivity against the sea, so that deep water is immediately gained. This pebbly nature of the shore renders the sea particularly sounding; to the increased noise of the breakers is added that of the pebbles as they fall over each other at the retiring of the waves. Facing the sea there is a pleasant terrace-walk; otherwise, from the smallness of the valley, and the general steepness of the hills, the airing-ground is very limited; this is the more to be regretted, as the stony character of the shore renders walking on it tedious and fatiguing. A small streamlet flows through the town, and a little to the eastward the river Otter empties itself into the sea, partly through a narrow open channel and partly through a raised bank of the water-worn pebbles.

The general character of Budleigh Salterton is that of a small unobtrusive watering-place, affording good accommodation for those desiring a place of quiet sojourn. The houses on the strand immediately facing the sea are conveniently situated, but those on the high grounds are generally to be preferred, except where climbing the hills is difficult to the invalid.

It is considered to be particularly healthy, and, as a residence, is applicable to those disordered states for which the climate of the district may be generally recommended.

SIDMOUTH.—This well-known watering-place, situated about fifteen miles to the east of Exeter, is most conveniently approached by a drive of nearly two miles through the luxuriantly-

* The materials of the Salterton beach are sandstone, flint, iron flint, hornstone, woodstone, calcedony, jasper of various colours, agate jasper, common quartz, shell agate, conglomerate, &c. The colours of these various stones, which all belong to the quartz family, are chiefly derived from the iron contained in them. The different shades vary from fine bright yellow chrome to the dark brown oxide of iron. The cliff, from the *débris* of which the beach is entirely formed, is a conglomerate of the new red sandstone.

wooded and pretty valley of the river Sid. It consists of a town, built upon a diluvial deposit of gravel, overlying the red sandstone at the bases of the Peak and Salcombe hills, together with numerous detached villas, which are scattered on their lower sides. These hills are about five hundred feet in height, with their summits rather less distant than two miles, so that they shelter the town very adequately, the latter to the westward, the former to the eastward; the valley itself is more distantly protected towards the north and north-west by the Honiton range, Cor hill, and the rising grounds of Harpford woods; in fact, Sidmouth is only open to the south, where it faces the sea.

Though the town occasionally suffers from south-westerly gales, which, when blowing hard, roar up the valley, covering everything to a certain distance with saline particles, yet it enjoys a complete protection from the easterly winds, especially on the Saleombe side of the valley, and these are the most trying winds of the district. Its generally sheltered position and southerly aspect render the climate very mild, probably more so than that of any of the places, excepting Salcombe, below Kingsbridge, hitherto described.*

The steepness of the high lands in the immediate vicinity of the town somewhat contracts the space for out-door exercise, but pleasant and sheltered walks are to be met with in the wooded valley, and, by the shore, the invalid can enjoy the fresh sea-breezes on a wide and extended terrace-walk, which commands a striking view of the expanded sea and the picturesque headlands on either side. The worn surfaces of these headlands are particularly interesting, from exposing the geological formations of which they are composed: their bases are of the new red sandstone, surmounted by the green sand, which, in the Saleombe hill, is capped by the commencement of the chalk.†

The water, which is procured from wells in the portion of the town immediately facing the sea, is hard and brackish, while at a very short distance, more inland, it is good and wholesome;

* The statistical account of the climate has been published by Dr. Cullen and the Rev. N. S. Heineken.

† For a description of the geology of Sidmouth, *vide* the "Guide to Sidmouth and the Neighbourhood," by Peter Orlando Hutchinson, Esq.

much, however, appears to depend upon the depth of the wells, the deepest affording the best water.

Sidmouth offers to the occasional visitant the usual requisites for a sojourn by the sea-side; the sea-bathing is good; the beach, though somewhat stony, is not so much so as to occasion any great inconvenience. Immediately to the east of the town is a small cove which has excellent sands, but it is not sufficiently accessible for bathing.

Both from its size and climate this place offers an agreeable residence to persons who have lived long in the warmer latitudes; it is well adapted for those labouring under affections of the liver; and during the autumn, winter, and spring seasons for the consumptive invalid; it is probable that during the spring months it is the best place upon the coast for those liable to pulmonary complaints generally; during the summer it may be too hot and relaxing.

It has been asserted that Sidmouth is peculiarly injurious to females labouring under menorrhagia; the experience of the resident practitioners does not bear out this opinion,—on the contrary, they deem it beneficial in these cases, as well as in dysmenorrhœa. They also consider it particularly serviceable in cases where an undue wear and tear of mind is followed by general depression and nervous irritability.* Calculus and typhus are unknown, and it is remarkably free, generally, from epidemics. Cases of a saccharine diabetes are not uncommon in the higher part of the valley.

Though, strictly speaking, BRANSCOMBE, BEER, and SEATON are not within the area of the south of Devon, they are so immediately contiguous that they may be briefly mentioned here.

BRANSCOMBE is about five miles to the east of Sidmouth, and is a remarkable place, being separated from the sea by an undercliff. It presents, in miniature, a valley of an alpine character. It is a freestone district, with a dry sandy soil—is warm and sheltered, with a dry, bracing air.

* On the Medical Topography of Sidmouth. By J. D. Jeffery, Esq. *Vide* "Transactions of the Provincial Medical Association."

BEER is situated in a narrow coombe running south-east. It is nearly land-locked, and of all places on the coast is the most sheltered. For those requiring a mild and genial, but fresh climate, no place can offer greater advantages. In respect of house accommodation, however, it is deficient:—being an old-fashioned, seafaring place, with but few or no modern residences. The beach is limited in extent, and so far rock-bound as to render the sea here often calm, though boisterous elsewhere. This is peculiarly the case when the wind is from the west or north-west. In ancient times the staple of the place was generally understood to have been smuggling; it is now the less adventurous one of fishing. The neighbouring country is chiefly supplied with fish from the boats of this place.

SEATON is a very favourite watering-place. It is freely open to the south, south-east, and north-west. It is sheltered from the south-west by the Beer Head, and from the north-east by the high lands between it and Lyme. The vegetation in the neighbourhood shows that the mild climate of the south of Devon is passing into the bleaker air of Dorsetshire. Seaton has a fine bracing climate, tempered by a soft mildness. There is here an open sea with a good beach. The bathing in calm weather is particularly good.

The above are the principal and most characteristic localities of South Devon. It is probable that the short accounts of them here given may fail to afford that amount of information which many a stranger would require; they are not, however, intended to be generally descriptive, or otherwise than suggestive of their applicability as residences where suitable climate is the main object sought for. On reviewing their peculiarities, it will be seen that in this respect they offer much variety.

CHAPTER IV.

NATURAL PRODUCTIONS OF THE SOUTH OF DEVON.

THE natural productions of a district are both interesting in themselves, and, to a certain extent, illustrative of the climate. The fauna of South Devon is singularly rich. There is no portion of the island which offers to the naturalist such an extensive range of the animal and vegetable creation. This is partly due to the extended seacoast, and partly to the variety of its climate and soil, presented by its low and high lands, and vast moor district.

To go into any detailed history of the several individuals which offer themselves for observation would be here out of place; moreover, I should be incompetent to the task. Some brief notice of those which are of more prominent importance, as illustrative of the peculiarities of the district, may, however, be offered, appending in the foot-notes reference to such nominal lists as have been published elsewhere.

MAMMALIA.—Of horned cattle numbers are bred, but not in great variety. There may be a few herds of short horns, the same of Guernseys, but the most interesting, as belonging peculiarly to this county, are the Devon cow and steer: they are considered by agriculturists as very valuable, and are much sought after in distant counties. The excellency of this breed has been partly attributed to the abundance and goodness of the water. The full-sized Devon cow, when fattened to its frame, weighs about nine score per quarter, and the ordinary average of the ox at five years old, and equally well fattened, may be rated at about thirteen score and a half: the meat is close-grained and excellent. The milk cows are kept throughout

the year in the open fields, their milk being considered better under these circumstances. The average quantity supplied daily by the Devon red cow, is in summer fourteen quarts, and in winter eight; five quarts of this milk yield eight ounces and a half of raw cream, seven ounces of butter, and two pounds nine ounces of pressed cheese-curd. In the south Hams there is a variety of this breed. Though originally proceeding from the red Devon, it is much larger and coarser, and does not fatten so well.

The sheep of Dartmoor are of small size, running, at five years old, about 16 lbs. the quarter; they afford what is commonly called the Ockington or Okehampton mutton, which is much esteemed; it is dark-coloured, peculiarly close-grained, and yields on cooking a deep rich modena red gravy; it has much of the shortness and flavour of venison. The other sheep, natives of Devon, are the horned Exmoor, running 15 lbs., the South Devon, 22 lbs., and the Bampton Notts, 28 lbs. per quarter. It is, however, now much the practice to pasture, in the rich cultivated lands of the south of Devon, the larger Leicester and other breeds; hence these are more generally to be met with, excepting in the moor districts, than the old native stocks. This is not from any better excellence of the meat, but from the larger stock being found to be more remunerative to the producer. Moreover, there is some difficulty in pasturing the native stocks in small inclosures, arising from their natural instinct for an extended range, and their pertinacity and activity in clearing fences in search of it.

The pig is of a large size, coarse-boned, lengthy, flat-sided, and stands high, is generally light haired, and looks spare and out of condition; fattens to six score a quarter. The average proportion of its pork to bacon, or lean to fat, is one of the former to one and a quarter of the latter. The native pig has, however, for some years been much crossed, and with advantage, by the Fisher Hobbs', Leicester, and Chinese breeds, and latterly there has been a tendency to supersede them entirely by the latter. Being a dairy county, the pig is largely bred, and there are few cottagers without one.

The ponies that run wild on Dartmoor are very celebrated; though not elegant in appearance, they are sure-footed, hardy, and in every way calculated for traversing the hills of this county. They are generally of a bay colour, with light muzzles, and somewhat larger than the well-known Exmoor breed. A cross, or large variety of this pony is the Devonshire pack-horse; these horses were much used for the conveyance of agricultural produce when the roads were less accessible than modern improvements have made them; they were permitted to traverse the roads loose, in parties of different numbers. One horse invariably took the lead, followed by the rest at a rapid rate, up and down the shingly hills, and occupying with their unsightly packs (*Devonicé* crooks) nearly the whole width of the road. Mules were formerly much used, now they are but rarely met with. The services of the patient donkey are still usefully retained.

Amongst the wild mammals * are the shrew mouse, which in the autumn season is often met dead, seeming at this season to be affected with some epizootic disease; the water shrew; the polecat; the badger; the otter. This last, though chiefly inhabiting the rivers, is, from its habits on our coasts, shown to be also a marine animal, constantly fishing out to sea. The pine marten, until recently, was occasionally met with in the larger woods, but is now never seen. The squirrel, dormouse, and many species of bats: these latter especially frequent the limestone districts. The pigmy and party-coloured bats are peculiar to this county.

The moor country † yields but scant sustenance to the wild mammal. The varieties met with there are only few in number; the rabbit, mole, weasel, and perhaps the stoat. In former days there were, beside, the red deer, the wolf, the brown bear, the boar, the wild ox, the elk, and the wild cat. The cultivation of the wooded sides and more fertile parts of the moor has driven these from their haunts.

* For list of the wild mammals, *vide* Bellamy's "Natural History of South Devon," p. 192.

† *Vide* "Perambulation of Dartmoor," Appendix, No. V., by Dr. Moore.

The red deer (*cervus elaphus*) in the south of Devon may now be said to be entirely extinct. Sixty years ago they were, on Dartmoor and in its wooded neighbourhood, tolerably numerous; and though occasionally one may be there met with (as was the case near Okehampton in 1838), yet it is generally surmised it had strayed from Exmoor, where they still exist in their wild state.*

Of the CETACEA little need be said. The porpoise is a frequent visitor to the coast and estuaries of the rivers; the grampus and the dolphin only occasionally so.

ORNITHOLOGY.—The birds met with in this district comprise a very large proportion of those indigenous to England. The number of species catalogued amount to 247.† Of the birds of prey, many that formerly were not unfrequent are either extinct, or so nearly so as to be rarely met with; but of the PICÆ, the PASSERES, the COLUMBÆ, and GALLINÆ, a very large proportion of what are British is to be met with; of the GRALLÆ and the PINNATIPEDES nearly the whole; but of the PALMIDES, many of the northern rarer birds are deficient.

Through the whole of the winter season the ring-plover resides on the coasts of our estuaries.

Swallows, redstarts, and the corncrake arrive about the first week in April, and leave the first week in October; swifts and flycatchers make their appearance early in May, the former leaves towards the end of July, the latter in September; the cuckoo is usually heard by the 15th of April. From the south the chiff-chaff arrives in March, and leaves in September; it has, however, stayed the winter. From the north the grey wagtail arrives in September; the fieldfare, starling, merlin, snipe, and woodcock, arrive early in October, as does occasionally the hooded crow.

* For an account of the Devon red deer, *vide* the classical work of C. P. Collins, "The Chase and the Red Deer."

† *Vide* Bellamy and Moore. It may be also observed, as an interesting fact, that the late Colonel Montagu chiefly pursued his researches on ornithology in this county, and from it many of the specimens that adorn the British Museum were supplied.

In the winter season numerous species of the duck tribe frequent the rivers. The wild swan (*anas cygnus*) is only an occasional visitor; amongst those which arrived in the winter of 1830, a few were found to be of that variety called the *anas Bewickii*.

The nightingale, which is generally supposed not to frequent Devonshire, occasionally visits this district. It has been met with in the neighbourhood of Exeter—both above and below the city—at South Bovey, and at Kingsbridge. Unfortunately it is a bird that is very easily trapped or killed, and this is generally the early fate of the stray visitor. The avoset and the ruff are also rare visitors.

The following is a list of some of the birds frequenting the river Exe during the several months of the year:—

January.—The golden plover and lapwing.

February.—Several species of gull, amongst these the saddle-back, red-legged mew, the green-legged mew, and large gull.

March.—Cormorant and varieties of gull.

April and May.—Cuckoo, curlew, and gulls.

June.—Sanderlings, heron, gulls.

July.—Kiterwake, sanderlings, herons, and gulls.

August.—Sandpiper, snipes, godwits, silver plovers, and grey phalarope.

September.—Teal, widgeon, baldcoot, osprey, tern, lav-rock.

October.—Golden-eyed duck, goosander, Borrow duck, red-headed widgeon, green shank.

November and December.—Wild swan, wild goose, wild ducks, northern diver, spoonbill, various sorts of grebes, sawbill widgeon, sea pheasant shoveler, turnstone, oyster catcher, long-legged plover, razor bill, puffin, mews, the lesser imber, petrel, dun-diver, and sheldrake.

Of the prized edible birds, the partridge is sufficiently plenty, and exists in spite of the general destruction that annually thins its numbers.

The pheasant is a foreigner, and was, I believe, only introduced into this county about sixty years ago. It can be fed

and preserved into any abundance, but this is not done as in some of the eastern and northern counties of England.

The black cock is sparingly found on the moors and the high ridge of hills above Honiton. This may be considered its southern limit. The grouse neither exists naturally on our moors, nor have the attempts to introduce it succeeded.

The woodcock is not so abundant as it used to be, probably due to the draining of many of the marsh lands. The common and the jack snipe are also less frequent; the great snipe is a rare bird. The white sabbine has been only occasionally met with. The golden and the ringed plovers are common; the grey plover is rare, but occasionally stays the winter. The rose-thrush and the little bittern are only rare visitors, as also the ring-ousel.

Of the web-footed birds, the wild duck, widgeon, and the teal are both plenty and good.

The various species of domestic poultry are largely cultivated, and Devonshire has its reputation for producing them good in quality.

Amphibia.—In number the species of these are very limited, thus marking the absence of tropical heat. Besides the toad and the common frog, which are frequent, the edible frog is met with. Both species of newt, the water and the smooth newt, are frequent; the palmated variety is occasionally met with; the nimble lizard is tolerably common; the viper is rare; the common snake or “long cripple,” and the slow worm are frequent.

ICHTHYOLOGY.—The fish that frequent the rivers and seashore of South Devon are exceedingly numerous, comprising in fact nearly all that are proper to the British Islands. Of those commonly used as articles of diet, the gurnard is a firm, light, wholesome fish; the mackerel appears on the coast about April, and in May and June is in fine season; the dory is plenty, firm, high-flavoured, and a much-prized fish; though a summer fish, it is the better for keeping a few days, if the weather permit. The grey mullet is abundant, but a soft and poor fish.

The red mullet is very fine. The dace swarms in the rivers, and vast quantities are in the warm summer months caught by the angler; the flesh is dry and poor.

The salmon is fine in all the rivers, but there is the common complaint of its progressive decrease. It is in season in the Exe and Teign rivers early in April, when it descends towards the sea; from November to January it ascends the river. Its flesh is rich, delicate, and as good as any salmon caught elsewhere.

The salmon trout is of good colour, though not so firm as the salmon; its flesh is good and delicate. It visits the rivers for one or two weeks only, chiefly in thundery weather.

The hepper abounds in the Teign, and is a delicious little fish. The common trout is plenty, of good flavour in the Exe and the Culm, poor in the Creedy and in the rippling streams of the moor, where it is of small size.

The pilchard occurs at times in great abundance; it is an oily and gross fish, and when cooked should be served with vinegar. The herring is small, tender, and good, but not so rich as that of the north coast.

The cod is large, but not a choice fish; it is apt to be soft, and its flesh not to flake well after being boiled. It cannot be compared with the north country cod.

The haddock is abundant; it is somewhat soft in texture, but its flavour is sweet and peculiar; it does not grow to the size met with in the northern seas, nor is it so good a fish. The whiting is plenty, fine, and good.

The hake is a frequent fish, and affords to the people a substantial amount of food, being cheap and abundant. It is somewhat soft in texture but good in flavour. The ling is also plenty, but has the same character as the cod of these seas.

The plaice are fine, and exceedingly sweet in flavour, as is also the flounder and the common dab. The turbot are unequal; sometimes they are large in size, but their flesh is not uniformly firm or gelatinous; too often the turbot of our seas are woolly in texture. The brill is particularly good, firm and delicate in flavour. Soles are abundant. They are firm, and fine in flavour, and are not surpassed by those of any other locality in the

kingdom. Eels and conger are good. The sand eel is delicate. The sturgeon is only occasionally taken. The skate is at times plenty, but is not much prized. The lamprey is not a common fish in the Devonshire markets.

Of the shell fish a few varieties are much used as articles of diet. Crabs and lobsters are good and plenty; shrimps and prawns, comparatively, are not abundant nor equal to those further eastward on the coast; the crawfish is not common; the scollop and the queen are particularly good, but from their rarity are only an occasional article of diet; the oyster, chiefly brought from Falmouth, is bred in extensive beds in the Exe and the Dart; it is large, coarse, and thin; the mussel and cockle are plenty and good, as are also the periwinkle and the whilk. In the severe winter of 1860 and 1861, the cockles and oysters were, in the beds opposite Lympstone, killed to a very large extent; the mussels were, comparatively speaking, uninjured.

BOTANY.—The indigenous phænogamous plants of Devonshire amount to upwards of eleven hundred.* The grasses form a tenth of the monocotyledons, and, together with the composite flowers, one-fifth of the whole of our phænogamous plants; the cruciform, leguminous, umbelliferous, rosaceous, labiatae, scrofulanæ, and cyparacææ, form together one-third more. The rest are comprised in the ranunculacææ and the caryophilleæ, and numerous other orders. Amongst the plants peculiar to this county the *chrysocoma Linosyris* and the *lobelia urens* are remarkable. The *primula veris*, and the *campanula rotundifolia*, of common occurrence in the adjoining counties, are but rarely met with. The *viscum album* is very rare. *Erica vagans* is chiefly restricted to the serpentine formation; *iris fœtidissima*, and the elm, are frequent on the red sand; the *cisti*, *climatis vitalba*, and *conyza squarrosa*, on the limestone; and the oak, on the schist formation. The *hypericum linarifolium* is found on the junction of slate with granite, as at Jersey. With these exceptions, and

* Vide "Flora Devoniensis," Jones and Kingston; "Flowering Plants and Ferns of Devon," Ravenshaw; "Flora of Sidmouth," Cullen; &c.

they must not by any means be taken in a strict sense, the distribution of the different species of plants appears to be quite independent of the various rock strata. The most striking local differences in the character of the Flora of the district will be found in that portion, chiefly composed of granite and schist, which is elevated and uncultivated, as contrasted with the more sheltered and reclaimed country on the red sand formation.

The *crambe maritima*, the sea kale, is frequent on the coast. "From time immemorial the country people have been in the habit of searching for, and gathering the tender shoots which show themselves in the spring through the sand and gravel, and which, thus naturally blanched, are, when boiled, a delicate vegetable." Dr. Lettsom promoted its use in 1795, and it was then largely procured from the Slapton Sands for garden cultivation. *Crithmum maritimum*, the samphire, though abundant, is not much locally used. The *ulva umbilicalis* and other species of ulva are supposed to be the true laver fuci. It is not so; the fuci used for this purpose are *porphyra vulgaris* and *p. laciniata*. All these plants are common upon the coast.

The *chondrus crispus*, or carrageen moss, is frequent both on the north and south coasts. This, if thoroughly washed in running fresh water and bleached in the oven, may be used instead of isinglass, for blanc-mange, &c., and will not betray its origin.

HORTICULTURE.—The markets are supplied with the best sorts of vegetables, and in the greatest abundance: cabbages are produced by the beginning of April; and some of the early kinds of broccoli, in favourable seasons, at Christmas; the principal crop, however, does not come in till February or the beginning of March. Potatoes are frequently brought to market in the beginning or middle of May, but this is considered very early; they are not produced in any quantity until June. Turnips are in good table order by May. The seasons, however, vary considerably; asparagus, which is the surest test of temperature, has been gathered as early as the 16th of March, while

in another year it could not be cut till the beginning of May.

Mulberries are fine, and occur in abundant crops; walnut trees, of very good kinds, bear well. The cob nut grows in the greatest abundance; the filbert is rarely met with good, but this is mainly owing to want of care in its cultivation.

Neectarines, apriots, and peaches in good aspects produce fine crops, the fruit being large and well-flavoured. Plum-trees, against walls, bear fruit of very fine flavour, while standards, in open gardens, are uncertain. It is generally considered that there is something in this climate injurious to the growth of the damson, and Devonshire people constantly affirm that it will not thrive in the county; this, however, is not the fact, as there are now many trees in the district producing fine fruit.

The apple-tree, generally speaking, bears abundantly; there are a few exceptions, but these may probably be traced to the trees being worn out, or to the orchards being badly managed. For cider-making, no apple can compare with the old bitter-sweet, or poeket and red streak apples. It is found, however, that soil and situation much influence the relative goodness of the apple. Generally speaking, on the clay slate the cider is mellow; in the granite district, where the soil is alkaline, and contains the decomposed silex, it is tasteless and devoid of vinous flavour; nor is it good on the limestone. Some of the old kinds of apples are lost or degenerated, and the Herefordshire grafts introduced by Mr. Knight have not answered. The Taunton black apple has in some warm situations produced an excellent cider; but take it altogether, none are equal to the old sorts.

A great variety of dessert apples are in cultivation, and no district in England produces finer fruit. The Cornish gilliflower, the old nonpareil, Ross's nonpareil, Coe's golden drop, Cox's pippin, &c., are amongst those that are generally admired. The old golden pippin is not now a common apple, but good trees of it are occasionally met with. The Ross nonpareil is in perfection from the beginning of November to Christmas; the Cornish gilliflower from the middle of November to Christ-

mas ; and the old nonpareil from Christmas to Lady-day. The earliest dessert apples are the Irish peach, early Margaret, and Jeanctin ; in favourable seasons, these are ripe in July. The sorts that keep the longest are the margil, the sturmer pippin, Van Mons, &c., retaining their crispness and flavour up to May and June in the following year.

The pear is extensively cultivated, but for dessert purposes only, perry not being made in the country. Nearly all the new and finer varieties produced by Van Mons, Le Clerc, and other Flemish pomologists, have been introduced, and do well as standards and espaliers, only a few requiring a wall. The earliest ripe is the citron des carmes, which generally is so about the middle of July ; and this is followed successively by other varieties till the May or June following. In fact, the pear thrives extremely well throughout the district, producing a thoroughly ripe and delicious fruit, and is only, if at all, inferior to the best productions of the Channel Islands.

The vine is uncertain : there are years in which an early grape ripens well in the open air, and is delicious. That this is not generally the case, occurs less from deficiency of temperature than the occasional prevalence of clouds in the summer and autumn intercepting those direct rays of the sun which are necessary to the maturing the fruit. Though the south of Devon has in this respect disadvantages, it enjoys ample compensation in its fields being usually unparched, and its springs flowing, during periods when elsewhere in England drought prevails.

All the British species of shrubs and trees thrive exceedingly well ; the myrtle is luxuriant in the extreme, and frequently forms an ornament to the cottage garden ; the cyprus and the cedar arrive at great heights, and the whole district is studded with elms, oaks, ilices, and firs, which grow in the greatest luxuriance. The furze and the heath often cover large surfaces ; and, with the laurels and evergreens, in midwinter and early spring exhibit a luxuriance and a depth of foliage which is very striking to the visitor from more northern countries.

The force of the south-westerly winds is observed much to

influence vegetation on the high lands; single trees are here seen spare, stunted, and invariably leaning towards the north-east, and almost bare on their south-western sides. The pastures are also very scant, presenting a remarkable contrast with those in the lower grounds and valleys. This is not, however, entirely due to the climate proper to the high elevation, but likewise to peculiarities of soil. The higher and colder Lansdown hills will graze an ox; Haldon will scarcely pasture a sheep.

The luxuriant humidity of some of the valleys is remarkably exemplified in the state of some of the orchards; the apple-trees are occasionally to be seen so covered with lichens and parasitic plants as to present the appearance of evergreen branches. This is doubtless injurious to the quantity and quality of the produce.

By way of marking the general mildness of the climate, it may be mentioned that it is not unusual to see throughout the winter the hedges studded with many of the native flowers, and that many of the tender and delicate exotics flourish in the open air, and are not destroyed by exposure during this season. The following are amongst these:—

Erythrina laurifolia.
Eriobotrya Japonica.
Laurus camphora.
Camellia Japonica, in all its varieties.
Camellia reticulata.
Thea viridis.
 — *bohea.*
Magnolia fuscata, var. *Exoniensis.*
Arundo donax.
Agave Americana.
Passiflora Brasiliensis.
Linum trigynum.
Coronilla glauca.
Hydrangea hortensis.
Nerina undulata.
Buddlea globosa.
Gazania rigens.
Photinia serrulata.
Mimulus cardinalis.
Verbena Melindres.

Illicum Floridanum.
Myrtus communis.
Punica granatum.
Citrus medica.
 — *limonum.*
 — *acida.*
 — *aurantium.*
Olea Europæa.
Gladiolus cardinalis.
 — *psittacinus.*
Alstræmeria, varieties.
Ixia, varieties.
Metrosideros saligna.
Chrysanthemum Indicum.
Cheiranthus tristis.
Eucomis punctata.
Hemerocallis Japonica.
Salvia angustifolia.
Edwardsia microphylla.
Commelina cælestis.
Ceanothus Azureus.

The following plants are killed to the ground every winter, or otherwise injured :—

Verbena triphylla.
 Amaryllis Belladonna.
 Azalea Indica, var. albitlora.
 Acacia armata.
 Fuchsia Thomsoniana.

Fuchsia virgata.
 ——— macrostemma.
 ——— thymifolia.
 Apios tuberosa.

In the warmer and more sheltered districts of Salcombe and Kingsbridge lemons and oranges have lived through the winter and borne fruit, totally unprotected, save by the wall against which they grew, and immense plants of the *Agave Americana* have flowered. There also grow in this district, in the open air, various species of the New South Wales and Mexican Acacias; the *Agapanthus umbellatus*, *Vallota purpurea*, *Amaryllis vittata*, *Gnidia simplex*, from the Cape of Good Hope; the *Daphne odorata*, from China; *Burgmansia sanguinea*, from Peru; *Clanthus puniceus*, from New Zealand; two species of *Eucalyptus*, *Sollya heterophylla*, *Veronica decussata*, *Cassia australis*, and *Conea alba*, from New South Wales; many species of *Salvias*, *Bouvardias*, *Stevias*; the *Ipomœa Tyrianthina* and *Amaryllis formosissima*, from South America; and the *Solanum pseudocapsicum*, from Madeira.

CHAPTER V.

CIVIL AND ECONOMICAL HISTORY OF THE SOUTH OF DEVON.

IN the preceding chapters those circumstances of the district of South Devon have been referred to which, being proper to and characteristic of it, are not capable of being materially altered. In this and the remaining chapters, some few of those other circumstances, whose origin is consequent and dependent on the social condition, will be considered.

OCCUPATIONS.—The inhabitants of the rural parishes are chiefly employed in agriculture, while those of the towns are artisans. The few mines (Christow, Bovey, &c.), the potteries and clay works (South Bovey), the lace (Honiton, Ottery) and paper manufactories (Exeter, Wear, Huxham, Hele, &c.) do not occupy a sufficient number of persons to give a character to the population. Save in the lace, and, to a lesser extent, clay and paper manufactories, the labour of the district is performed by the male sex, the females being chiefly occupied in domestic duties.

Exeter, the principal market and port of the district, was formerly a great emporium for the thinner kinds of woollen goods, such as serges, druggets, estamines, and long clls, which were spun and woven in the towns around, and then dyed and finished within the city; whence they were shipped to Holland, Italy, Spain, and the East Indies. The serge manufactory, which a few years since was of much importance, is now nearly extinct. When the woollen trade was in its greatest prosperity, it was estimated that eight out of ten of the labouring population were engaged in the various departments of its manufacture; now there are but a very limited number employed in the few fulling

mills yet at work. Since the working of machinery by steam-power, the greater facilities for obtaining the necessary fuel in the north of England has caused this trade to be for the most part removed thither. The abundant but intermitting water-power of this district has given way to that which can be more uniformly applied by the steam-engine; so that even few of the local water-power mills are now without auxiliary steam-power.

The trade of Exeter is at this present time nearly limited to the importation of foreign commodities and home goods, necessary for domestic consumption: the latter consists of general merchandise from all the principal ports in the kingdom; the former of wine and spirits, timber, hemp, tallow, hides, valonia, bark, and fruit.

The manufacture of lace is by hand and in looms. The pillow or bone lace, though much superseded by the loom lace, yet occupies a large number of females, especially at Honiton and the neighbouring villages. It is a manufacture of great local antiquity. It is an interesting sight to see the young girls, at the doors of their cottages, sitting with the leather pillow on their laps, and plying, with inconceivable rapidity, the innumerable bones that hold the threads, which, by their practised skill, and ingenuity, and taste, form the beautiful work known as Honiton lace. The factory at Tiverton is far-famed, and occupies the large number, directly and indirectly, of fifteen hundred people. The factory at Ottery is also an extensive one. GLOVE-MAKING occupies many, chiefly females, but only in their own houses. Formerly the manufacture of shoes, especially in Exeter, was a business of much importance. They were largely sold at the local fairs, and exported. On looking over the old parish registers it is remarkable to see how many are stated to be "cordwainers."

POTTERIES.—The coarse "clome" pottery of Honiton has its local reputation, and is of an ancient date; the potteries of South Bovey are more ambitious, and produce a good white ware: the white, and, to a less extent, the blue clay of the Bovey Heath-field and the neighbourhood, are excellent for this purpose. The

lignite or Bovey coal is not so satisfactory for the "firing," and the modern facility of obtaining by railway carriage the coal from the Bristol and north country fields is superseding its use. Three thousand tons of the latter is more than equivalent to twenty thousand of the lignite. In order to obtain the necessary amount of kiln heat from the lignite, a vast bulk is required to be burnt, its power of combustion being so feeble that a fifth or a sixth of the quantity of the up-country pit-coal is its equivalent in this respect. In consequence of the adoption of the latter, there is now not a tithe of the lignite raised that used to be, nor are the potteries in the activity they were. The Spear and Stilt works were closed a year since; and in the remaining pottery, at the conclusion of the last year—that is, at Martinmas (the 11th of October, being the end and commencement of the potter's year)—there was a reduction of hands. The number now employed in these works—in the pottery and in the brick yard—is 228, consisting of 110 men, 44 women, 49 boys, and 25 girls.

The "porcelain clay" is a staple of considerable importance, and is exported in large quantities dug up from the pits in the shape of large square masses; it was formerly evaporated to dryness by kiln heat—a slow and expensive process. Latterly it has been dried by pressure—a machine having been invented which satisfactorily performs this work.

From the frequent occurrence of masses of clay in all parts of the district, BRICKMAKING is largely followed, and, save in the winter season, occupies a considerable number of people: women and children assist in the manufacture.

WHETSTONES, or "Devonshire Batts," are extensively "manufactured" from indurated concretions of the greensand (*vide antea*, p. 89). The chief quarries are on the western aspect of the Blackdown range. Some years ago Haldon also afforded some of the stones. When first quarried the concretions, being somewhat soft, are then "manufactured" into the required shape. They are largely exported. The mining and shaping

these stones is an unhealthy occupation, and many of the labourers suffer in consequence from pulmonary disease.

HOUSES.—The houses of this district are built of brick, made from the red clay of the country; of the conglomerate and trap rocks already described (*vide antea*, pp. 69 and 82); of lath and plaster; and of what is provincially termed “cob.” In their constructions and relations, the first three present nothing remarkable; the last, however, is peculiar to the west of England, and may therefore be described.*

The walls are composed of clay-earth and straw, mixed up with water, like mortar, and then well beaten and trodden together. This mixture is always laid upon a foundation of stonework, it being necessary to keep it dry: hence the Devonshire adage, that “all cob wants is a good hat and a good pair of shoes.” The cob mixture is laid on in layers, generally from two to four feet in depth; it is essential that each separate layer should be allowed some weeks to settle, and it is then pared perpendicularly even, before another is added. When the successive layers form walls of sufficient height they are surmounted by thatch. Some months after the walls are quite finished, and supposed to be dry, they are plastered, whitewashed, or rough cast, which provincially is called *slap-dash*. This mode of building is much cheaper than stone or brick, and if kept dry is very durable. Cob houses are warm in winter, cool in summer, and in every respect as comfortable as other buildings; they form picturesque objects in the landscapes of Devon, grown over, as they generally are, by myrtles, rose trees, and other shrubs and flowers.

FUEL.—On this head little need be said. That which the district affords, viz., wood—excepting in the country or to those who fell their own timber, is too expensive for general use: coal, which is imported from the north of England, from Wales, and latterly from the Bristol coal-fields, may be said to be the only fuel used. Turf is occasionally burnt, as is also tan (the

* *Vide* an article contributed to the *Quarterly Review*, No. 116, by the late Richard Ford, Esq., in which the introduction of this mode of building into Devonshire is attributed to the Phœnicians, who in early days traded extensively with the western peninsula of England.

refuse oak-bark of the tanners), but the use of these is only exceptional. The lignite, or Bovey coal, is used by the cottagers in the neighbourhood of this deposit; but the feebleness of its combustion, and the unpleasant smell accompanying it, preclude its general adoption. At distant times borings for coal have been made in various parts of South Devon—generally in the new red sandstone formation—under the impression that it was the old red sandstone, and the equivalent of the coal measures. This impression was strengthened by the occasional occurrence of a carbonaceous slate found after piercing through the new red sandstone. In 1787, a coal company, then formed, sank shafts in the parish of Bradninch; and in 1818 shafts were sunk in the carbonaceous rock, but without any satisfactory results. In 1835 another company was formed, with the intention of again working the new red sandstone in the Bradninch country; but after taking the opinions of Mr. Webster and Sir H. De la Beche, which negatived the probability of coal being found there, all further search has been relinquished.

ROADS.—The roads of Devonshire were, so lately as fifty years ago, notorious for being bad, and to carriages almost impassable; in fact, with the exception of the few main high roads, entirely so. They were narrow water-ways, enclosed by high earth banks, surmounted by dwarf oak and other hedge wood, and thickly planted with tall elm trees. The surface of the roads was uneven, being formed of deep ruts, alternating with large rubble, water-worn stones. These roads passed over the steepest hills, and descended into the lowest valleys; and almost invariably, at the bottom, watercourses had to be crossed. At this time there were but few wheeled carriages in use—in the agricultural districts none—all was done on horse-back; and then the pack-horse, with the pack for heavy traffic, and the pillion for carrying “double,” was esteemed and valued. This is now all changed; McAdam has had his rule; and save that here and there the steeper hills of the county are to be contended with, the roads are wide, and in good travelling condition. The district affords, if well chosen, good material

for road-making, in ample quantities. For this purpose the granite is not first-rate, but the flints and cherts of the green-sand are excellent, and are now being largely used. Selected portions from the Trappean rocks, and the limestones and harder veins of the Devonian and carbonaceous groups, are also particularly good.

THE EXETER CANAL* is too importantly connected with the trade of this district to be passed over without some notice. It was made in the reign of Elizabeth, and at that time extended only to Countess Weir; in the time of William the Third it was prolonged to the sluice-gates, which are a little above Topsham, on the opposite side; the further extension to the present mouth at Turf was commenced in 1825, and completed in 1829. The canal has now a surface breadth of 100 feet, and a bottom breadth of 34; its depth averages 15 feet, so that vessels drawing 14 feet of water easily pass up it. "In depth it is surpassed only by the Caledonian and Gloucester canals, whilst its sectional area is exceeded only by the former." The advantages gained by the recent alterations are a generally improved system of lockage,† increased depth, and a communication with the river at a part where the channel is more than 14 feet deep. The effect of these improvements on the trade of Exeter has been very beneficial; it is estimated now to be double what it was in

* Mr. De la Garde, in an interesting paper "On the Antiquity and Invention of the Lock Canal of Exeter," published in the 18th volume of the *Archæologia*, proves (contrary to the general belief that the formation of artificial lock canals in this country does not date earlier than 1755) that a navigable canal, with a complete apparatus of pound-locks, was formed at Exeter so far back as the year 1566. He thinks it highly probable that it was the first pound-lock canal ever constructed. *Vide* also Oliver's "History of Exeter," p. 249.

† "These locks are masterpieces of scientific construction. The Turf lock is built on piles, driven through a fluid bog into the subjacent rock, twenty feet beneath the inverted arch. It is 131 feet in length, and 30 feet 3 inches in breadth. Its lower sill is two inches under Exmouth bar, with 16 feet water on the upper sill. Vessels of great burden pass through this lock in three minutes. The whole canal, which was carried on in the face of great natural difficulties, is finely executed. The engineer was James Green, Esq., of Exeter. A plan has been engraved, under the auspices of the corporation, of the canal, with his extensions and improvements."—(*Archæologia*, vol. xviii.)

1825. The average number of vessels lying at the quays is about 20; these quays are situated adjoining the city on the eastern bank of the river, where it has a width of 120 feet, and an average depth of 9; and round the sides of a basin which is connected with the upper part of the canal, and is 900 feet in length, 120 in breadth, and 15 in depth.

THE STOVER CANAL is a small lock canal, commencing in the parish of Teigngrace, and delivering itself into the Teign river a little below Newton Abbott. The traffic of this canal is chiefly the clay of Bovey Heathfield; formerly, when the quarries at Haytor were worked, it transmitted the granite thence procured.

THE TIVERTON AND WESTERN CANAL, a portion of the Grand Western Canal (which is not as yet, and probably never will be, completed), commences on the side of a hill, immediately above the town of Tiverton, and terminates, after an extension of twelve miles, near the village of Holcombe Rogus. It thence, by a series of "lifts," joins the canal from Bridgewater to Taunton and Wellington. The traffic on this canal is chiefly limestone, from Westleigh. Coals, which used to be conveyed upon it to the adjacent parishes, are now carried exclusively by the railroad.

RAILROADS.—South Devon has now become the centre of several converging lines of railway, so that communication with the other parts of the kingdom is facilitated. All the principal towns and watering-places enjoy this advantage. Some years ago a granite tramway was made to connect the Haytor Granite Works with the Stover Canal. This still exists, and on occasions is in use.

WATER SUPPLY.—The district is amply supplied by its springs, streams, and rivers. Many of the larger towns, as Tiverton, Honiton, Cullompton, have by artificial means neighbouring streams conducted through their streets, so that water is flowing in front of nearly every house. Exeter, Teignmouth, Newton, and Torquay are supplied by reservoir and waterworks.

The EXETER WATERWORKS derive their supply from the river

Exe. About two miles above the city the river is diverted by the Pynes weir into a leat. From this leat the water is pumped into reservoirs, situated on rising ground, 160 feet above high-water level, to the north of the city, known as the Dane's Castle Field. Of the chemical composition and quality of this water mention has already been made.* Taken from above the city and above the confluence of the Creedy, it is free from the pollutions of the former, and occasional red discolorations of the latter. Since the original formation of these works in 1833,† in 1841 a new wheel and pumps were added, and the reservoir enlarged.‡ In 1853 a steam-engine was erected at the reservoir for the higher services, and the construction of new reservoirs and filtering cisterns at the Dane's Castle Field. In 1856 there was the further addition of steam-power at Pynes.§ The present works consist of, at Pynes, two water-wheels and a steam-engine, of 30-horse power; at the Dane's Castle Field, of two large reservoirs, two filter beds, with wells attached, and a steam-engine of 12-horse power, for the supply of the higher services. The total cost of these works has been about £69,000. The pumping power of the water-engines at Pynes is, in the 24 hours, 792,000 gallons, and of the steam-engine 840,000 gallons, making a total delivery of 1,632,000 gallons. The reservoirs contain 6,250,000 gallons. About 6,000 houses in the city and suburbs are supplied by these works, the daily quantity consumed being 1,092,700 gallons, or 182 gallons per house. The cost of this to the consumers, according to the amount of rents paid, is a farthing per hogshead, and at this trifling price it is supplied to many houses at a considerable elevation. The waste consequent upon this vast consumption is of the greatest service in preserving the health of the city, by cleansing and washing out the sewers, &c.

* *Vide antea*, p. 95.

† For an account of these works, and their progressive enlargement, *vide* Health of Towns Report, Report on Exeter, p. 16.

‡ The above works were designed and carried out under W. Anderson, C.I.

§ These works were designed by, and carried out under the superintendence of I. Simpson, C.I.

TORQUAY AND NEWTON ABBOTT WATERWORKS.—This water supply is derived from a tributary of the Teign, in the parish of Hennock, in the neighbourhood of the Dartmoor hills, about 16 miles distant from Torquay. The storage reservoir, which is 200 feet above the level of Torquay, covers about 20 acres of ground, and contains 42,000,000 gallons. From this storage reservoir it is conducted, by a 10-inch main, through Newton Abbott to Mary Church and Torquay. There is an open reservoir at Newton, containing 500,000 gallons; and two reservoirs, one covered and one uncovered, in the district of Torquay,—the former containing 500,000 gallons, and the latter 1,500,000, for the supply of the higher and lower levels of that place and St. Mary Church.* This amount of water is equal to a week's supply, while that of the storage reservoir at the fountain head contains sufficient for a two months' supply.

DIET.—With the exception of a few articles, there is nothing very peculiar to be noted under this head. Amongst the opulent, the various good things for which Devonshire is famed are indiscriminately used. The diet of the poorer classes consists, for the most part, of milk, potatoes, and *fine* bread; coarse bread is but seldom eaten, excepting on the moor, where barley bread is a frequent article of diet. The Sunday is generally gladdened by baked meat; otherwise they consume but little animal food. Hake is a favourite fish, wholesome and cheap; sweet, but soft and woolly. It is usually cut into junks, and baked, with the addition of some fat, in large oval flat dishes.

CIDER is the common beverage throughout Devonshire; it is drunk in a very different condition from that in which it is met with elsewhere. The cider which is sold in London, and in other places, as imported from Devonshire, is sweet, with some flavour of the apple, and very poor in body; while that which is preferred for home consumption is of a light colour, full in body, and somewhat rough in taste. The old cider-drinker has no objection to its being a little "hard" (*i. e.* sour), and

* These works have been constructed by Messrs. Easton and Amos, C.I.

will call that a good cider which is full in body, rough in taste, and has no flavour of the apple remaining in it.

The process of making cider is very simple. In the autumn the apples are collected into heaps in the open air, and allowed to *sweat* or pass into a state of fermentation. Such of these as become black-rotten are, or should be, thrown aside; the remainder are broken up and put into the cider press, and the resulting fluid is known and sold under the name of "cider from the pound's mouth." This is immediately put into a large vat, and there allowed to remain till a head has risen; which takes place in one, two, or three days, according to the state of the atmosphere: it is then drawn off into casks, and permitted to ferment. As often as a head rises on it, or there is a generation of fixed air, so often is it racked into a fresh cask. It usually requires racking three or four times, but in very warm weather seven or eight. When the juice no longer ferments, the process of vinification is complete, and the cider is made. It is now fit for immediate use, though it is generally esteemed better if kept for a month or two. During the hay and corn harvests each labourer is allowed on an average a gallon of this cider a day.

In the above the plain old mode of manufacture is described; but to produce ciders of a peculiarly sweet taste for exportation, *matching*, or some other means of checking fermentation, is resorted to. It is, though erroneously, generally stated that an *unmatched* cider will not bear water-carriage for the shortest distance, nor sustain in the cask continued motion for any length of time. Matching cider is thus accomplished. After it has been removed from the vat into the cask, as previously described, it is suffered to remain there until a head has formed, or it shows a disposition to ferment; a small quantity of the juice (say a gallon) is then drawn off into an empty cask, and while a sulphur match is being burnt within the bung-hole, the juice is agitated round the sides of the cask, the remainder is then added: this process is repeated in a fresh cask, as often as it shows a tendency to ferment. In cold or still weather two matchings are sufficient, but when the weather is hot and windy

it may require to be done four or five times. This process, by checking fermentation, and thus preventing complete vinification, produces the sweet fluid in which the flavour of the fruit is retained. This cider does not contain so much alcohol as that made by the process previously described; at first it is very sweet and raw, and tastes of the apple, predisposing those who drink it to griping pains and diarrhœa, but at the end of three or four months becomes a palatable and wholesome liquor. To those who are not cider drinkers, in the Devonshire acceptation of the term, it is much more palatable than the cider in which the successive processes of fermentation have converted into alcohol all the saccharine principles of the apples.

Dregs are deposited during the fermentation: these were formerly collected and distilled into a coarse ardent spirit, vulgarly called "still spirits." This is now scarcely ever made, in consequence of the present improved method of straining and fining the dregs, by which all that was available for this purpose is converted into cider.

Cider is frequently observed to change colour, and turn black, especially after exposure to the air; those unacquainted with this property are apt to ascribe it to some adulteration practised by the manufacturer. It is, however, due to the natural tendency which apple juice has to become black, when exposed to the air. The "matched" cider most quickly undergoes this change.

There is great difference in the quality of the cider made from apples grown on different soils. For the most part those grown on the granite and the limestone yield a poor cider; those in warm spots on the Devonian clays a rich cider; as also those in favourable situations on the red sandstone.

The former frequency of colic in this county, hence called the "Devonshire colic" (*Colica Pictonum*), was traced to the existence of lead in cider, derived from the leaden basins used in the cider presses. This mischievous part of the "pound" is now almost entirely exploded, and in its place wooden basins are substituted. The modern cider does not cause colic.

DEVONSHIRE CLOUTED OR CLOTTED CREAM* is made in the following manner: The milk is allowed to remain from twelve to twenty-four hours in tin or other pans, capable of holding two or more gallons; these pans are then placed on a very slow fire, for an hour and a half, or rather until a yellow rim is formed, and some bubbles begin to make their appearance; it must not be suffered to boil, or the whole will be spoiled; on being removed from the fire it is set aside from twelve to twenty-four hours to cool; at the expiration of this time the "head," or cream, has risen to the surface, and may then be taken off as fit for use. This cream is particularly white, thick, soft, deliciously cool, and less greasy than the raw cream, and may be esteemed far more wholesome, standing much in the same relation to it as the scalded does to raw milk.

A dish in some estimation in this county is junket: for making it the following may be relied upon as a good receipt: To two quarts of milk warm from the cow, add brandy and sugar to taste, and then turn it with rennet, lay clouted cream on the surface, over which grate nutmeg and sugar; it is now fit for use; if made as above directed, it will keep solid till the next day, but if the milk have been artificially warmed, the junket must be used within a few hours, as it is liable to "run."

Butter is not made from the raw cream, as is the custom in other counties: the usual method of making it, throughout

* This process of preparing cream appears (as well as the cob building) to have been an importation from the East: Edhem Bey, the Egyptian minister of public instruction, informed me that it was made beneath the Pyramids, exactly after the manner pursued in this county; and in Fellows's "Tour in Asia Minor," p. 96, we find the following passage:—"Among the hospitable presents that I have frequently received on my journey, was a simple preparation of cream used in this country, and made from the milk of the goat or buffalo, which I have not very much liked; but here it is made of cow's milk, and is so excellent, that I give the receipt. It is called kymar, which means scum. Take a pan of new milk, let it stand on a stove, or near a fire, to simmer, but not boil; a thick scum will form over it, which must not be broken; when this is well formed, set the whole by till the next day to stand for cream, and it will be found that the cream has saturated and adhered to the spongy under part of the scum: this coating, nearly half an inch thick, may be taken off, and doubled or rolled up; it will keep for some days, and is excellent with fruit or coffee, and good with anything. The people here seem to use it as a substitute for butter."

Devonshire is from the clouted cream, by hand and not in the churn ; so made, it is preferable, as keeping longer, and being freer from the adventitious flavours of pasturage, which are more frequently retained in the general mode. One pound and a half of this cream is estimated to yield one pound of butter, leaving a residue of half a pint of very rich buttermilk. The general arrangement of the dairy consists in preserving cleanliness, by daily washing and scalding the utensils, and in hot weather lowering the temperature by the sprinkling of cold water.

LAVER.—The true laver is the *Porphyra* (*P. vulgaris* and *P. laciniata*), which grows on the tops of exposed rocks, at about half tide. Occasionally ulvas (*U. latissima* and perhaps *U. lactuca*) are used ; but the country people of Ilfracombe, who chiefly prepare and supply the market with the best quality of laver, carefully reject the “green weed” from the “brown.”

The laver is prepared for the market as follows :—It is first washed in “twelve waters,” or, preferably, in a running stream ; then it is picked over and freed from all other sorts of seaweed, shells, &c. ; then wrung out and thrown into an iron crock with a very little water, and allowed to simmer over a stove for five or six hours ; towards the end of this time a small quantity of vinegar and a lump or two of lard or butter are added, care being taken that it does not get too dry and adhere to the sides of the crock, and so become shrivelled and burnt. It is sold at three-halfpence a pound, and will usually “keep” for about three weeks after it is prepared.

For the table, it is warmed up with more vinegar and butter, and served up hot—the hotter the better ; in this state it is mucilaginous, and forms an excellent adjunct to a slice of mutton. It is also made into small cakes, which are floured on all sides and then fried ; but the former is the more usual mode of serving it.

AMUSEMENTS.—On this point little need be said, the only amusement generally indulged in, which is peculiar to this

county, is wrestling ; it differs much from the sport so called and practised in Cornwall and the north of England, inasmuch as the barbarism of "kieking shins" is permitted, a custom which is very prolific of obstinate ulcers of the legs in after years. During the last twenty years this sport has much declined, and promises soon to become extinct. A description of the mode of "play" will be found in Vancouver's "Survey of Devon," p. 470.

CHAPTER VI.

VITAL STATISTICS OF THE SOUTH OF DEVON.

THE South of Devon, comprised in the Registrar's Districts of Honiton, St. Thomas, Exeter, Newton Abbott, Totnes, Kingsbridge, Okehampton, Crediton, and Tiverton, has an extent of 826,788* acres, and is occupied by a population of 286,507 persons.

The average density of this population is about the same as that of the whole of the county, there being one person to every two acres and three-fourths of an acre (2·88). Of course the "proximity" of this population varies considerably, being in the town far greater than in the rural districts, varying from a proportion of one person to 6·82 acres (Okehampton), to one person to 0·05 of an acre (Exeter). Dense as the average population of South Devon is, it is less so than that of the whole

* Registrar's Districts.	Area in Statute Acres.	Population, 1861.	Density. Area in Acres to each person living.
Honiton . . .	80,867	22,727	3·56
St. Thomas . . .	130,141	48,403	2·68
Exeter . . .	1,800	33,741	0·05
Newton Abbott . . .	117,396	59,065	1·98
Totnes . . .	98,342	32,954	2·98
Kingsbridge . . .	72,918	19,363	3·76
Okehampton . . .	126,797	18,580	6·82
Crediton . . .	91,866	20,274	4·47
Tiverton . . .	106,661	31,300	3·40
Total . . .	826,788	286,407	2·88
Devon . . .	1,657,180	584,531	2·88
England . . .	37,324,915	20,061,725	1·86

of England and Wales, which amounts to the average density of 1·8, a little less than two acres to each individual. Though South Devon has in much of its area the capability of supporting a large population, yet there are considerable portions of it deficient in this respect. The green sand formations of the East of Devon and of Haldon, and the granite of Dartmoor, afford but scanty sustenance, and in the winter season offer to man but a bleak and inhospitable climate. Then, in South Devon, no large manufacturing population is massed together, to swell up the average of its density.

The population throughout this district had been steadily increasing from 1801 to 1841 (*vide* Population Return, 1851). From 1841 to 1851 it was almost at a standstill. The total increase in this period was 66 per cent.,* an increase very much below the progression proper to a healthy and thriving population. The increase of all England during the same period was 101 per cent., nearly double that which has occurred in South Devon. The census of 1861† reveals in this district a different, and perhaps an alarming state of things, viz., a decrease of the population. In 1851 it amounted to 288,827. In 1861, to 286,407, showing a deficiency in the ten years of 2,427, or 0·8 per cent. England has increased 12 per cent. in the

* Increase per cent. in the county of Devon at decennial periods :—1801, 12 per cent.; 1811, 15 per cent.; 1821, 13 per cent.; 1831, 7 per cent.; 1841, 6 per cent.

† Registrar's Districts.	Population.			From 1851 to 1861 the population has	
	1841.	1851.	1861.	Increased.	Decreased.
Honiton . . .	23,892	23,824	22,727	—	1,097
St. Thomas . . .	47,099	48,806	48,403	—	403
Exeter . . .	31,312	32,823	33,741	918	—
Newton Abbott . .	44,359	52,306	59,065	6,759	—
Totnes . . .	34,128	34,022	32,954	—	1,068
Kingsbridge . . .	21,537	21,377	19,363	—	2,014
Okehampton . . .	22,001	20,401	18,580	—	1,821
Crediton . . .	22,035	21,728	20,274	—	1,454
Tiverton . . .	33,125	33,540	31,300	—	2,240
Total . . .	279,488	288,827	286,407	7,677	10,097

same period. To what is this to be attributed? Certainly not to any inordinate mortality; for this is under the annual average of 2 per cent. Nor to any deficiency in the number of births; for these exceed the deaths by 26,697. If the births in the ten years (82,773) be added to the population of 1851 (288,827), and from the product the actual number of deaths (56,076) be deducted,* (or to put it in another and more simple mode, if the difference between the births and deaths in ten years be added to the populations of 1851,) the deficiency becomes more striking, for it amounts to nearly thirty thousand (29,117). Large as this amount appears to be, it really understates the deficiency, provided the progression of the population had healthily developed itself—or even if it had developed itself in the proportion of the experience of the whole kingdom, which is an increase of 12 per cent. in the ten years. To examine the subject on the former hypothesis might be considered strained, while there is actual and present experience for the latter. It is therefore legitimate, and within the bounds of probability, to state it. The population of South Devon in 1851 was 288,827; whereas it ought, according to the ratio of increase for the past ten years of the whole of England and Wales, in 1861, to be 326,085. This shows a deficiency of nearly forty thousand (39,678),—an inference of very notable importance. Before in any way attempting to account for either the inferential deficiency or the actual diminution in the amount of the population in South Devon, it may be useful to examine the position of the several masses of population which make up the total proper to the district.

* Population, 1851	288,827
Births in ten years (add)	82,773
	<hr/>
	371,600
Deaths in ten years (subtract)	56,076
	<hr/>
Estimated population in 1861	315,524
Actual population in 1861	286,407
	<hr/>
Deficiency	29,117
	<hr/>

In the census of 1851 there were general indications of the deficiencies that have become apparent in the census of 1861. Newton Abbott (which includes Torquay) alone showed a considerable increase, and Exeter and St. Thomas a moderate one. The whole of the rural districts even then showed an actual deficiency. In the last census of 1861, if the districts of Newton Abbott and Exeter be excluded, in both of which there has been an increase—in the latter of 918, and in the former of 6,759—the deficiency in the remaining districts amounts to 10,097 (*vide* table, page 158). This is an actual deficiency, and irrespective of any speculations as to that due to the excess of births over deaths, or to the probable deficiency on an estimate of the ratio of increase proper to the population.

If our investigations be extended over the larger area of England, one great fact appears to be developing itself, and that is, a tendency of the population to leave purely agricultural districts for towns. The census of 1861 shows generally a decrease of population in the former, while the latter are growing larger.

In the area to which our attention is now more particularly directed, there is, as has been shown in the Newton Abbott district (*vide* table, page 158), an increase of 6,759, so that the population now amounts to 59,065. This so nearly approximates to that which it ought to be on the calculated increase of the ratio of the kingdom (12 per cent.), as to dismiss it from further inquiry. Newton Abbott district has fulfilled the conditions of the natural increase of the kingdom.* Exeter, which has actually increased by 918, and has now a population of

* Registrar's Districts.	Population, 1851.	Population as it should be, 1861, the Annual Increase being 1·22 per cent.	Population according to census, 1861.	Deficiency on estimated population.
South Devon . . .	288,827	326,085	286,407	39,678
Exeter	32,823	37,057	33,741	3,316
Newton Abbott . . .	52,306	59,053	59,065	—
Country Districts . .	203,698	229,975	193,601	36,374
Town Districts . . .	85,129	96,110	92,806	3,304
(Exeter & Newton Abbott.)				

33,741, should have, according to the ratio of increase of England, 37,057; so that here there is an estimated deficiency of 3,316. It now becomes evident that any deficiency of population in the country districts of South Devon is not due to a drain established for the benefit of the town districts within the area of South Devon. What then is the estimated deficiency in the country districts of South Devon? What are its causes? and to what does it tend? These are all questions of great interest, and well worthy of being seriously considered.

The estimated deficiency in the population of the country districts of South Devon amounts to 36,374, an amount which is startling in the extreme. It shows that a large migration of its natural inhabitants has taken place, perhaps to other districts of the kingdom, may be to other quarters of the globe.

Looking at the general returns of the kingdom in the census of 1861, one is much struck with the fact that the large towns of 1851 have become considerably larger;* while, for the most part, the agricultural districts are less populous. From this it may be inferred that the rising generation look to higher wages and to more material comfort than is afforded in the agricultural districts. Probably there may be in the present day a tendency to be "skilled artisans," who find opportunity for their vocation only in the towns. It is worthy of remark, the decline is contemporaneous with the formation of railways. Be the cause of the exodus from rural districts what it may, it is a question which before long must seriously influence the agricultural interests of this county, if not of the country generally. The wages of the farm labourer must be increased, and, as a con-

* Though the population of the large towns is thus increasing, the increase is rather in area than in density. A column in the Registrar-General's recently published Annual Report, which enumerates the population in all the sub-districts and divisions adopted for the purpose of registration, above 2,000 in all, shows in some detail not only this great movement from the rural districts into the towns (a displacement of population which is more or less general over Europe,) but also that the population flows, at least for its habitations, to the suburbs of these towns, so that the bricks and stones may be encroaching on the neighbouring green fields, yet there is also an exodus from the heart of the great towns themselves to the surrounding area. This is exemplified in Exeter, and London offers striking illustrations of it.

sequence, the prices of the necessities of life will then be enhanced.

SEXES.—The females * slightly preponderate over the males, there being 52·6 per cent. of the former to 47·3 of the latter. This is rather a larger proportion than is common to England. It would also appear that females disproportionately congregate in the towns. In the agricultural districts, generally, the sexes are nearly equal—about 50 per cent. of each, while in Exeter there are 56 females to 44 males, or a preponderance of 12 per cent.

This is probably partly due to the large amount of domestic female service required by a town population, and partly to the specific labour of females being with greater facility pursued in town localities.

The proportion of the unmarried to the married is nearly equal, both in males and females; but the number of widows is twice that of widowers: hence it may be inferred that the risk to life in adult male occupation is greater than in that of the female.

MARRIAGES.—The annual record of marriages is found to be an index of the relative prosperity of the times. The more

* As the enumeration of the sexes in the census of 1861 has not yet been published, that of 1851 is here referred to.

Registrar's Districts.	POPULATION, 1851.			Proportion of Males & Females per cent.	
	Males.	Females.	Total.		
Honiton . .	11,426	12,398	23,824	47·9	52·0
St. Thomas .	22,697	26,109	48,806	46·5	53·5
Exeter . .	14,457	18,366	32,823	44·0	55·9
Newton Abbott .	24,193	28,113	52,306	46·2	53·8
Totnes . .	13,802	18,220	34,022	46·4	53·6
Kingsbridge .	10,388	10,939	21,377	48·5	51·5
Okehampton .	10,293	10,108	20,401	50·4	49·5
Crediton . .	10,794	10,934	21,728	49·7	50·3
Tiverton . .	19,552	20,011	39,563	49·4	50·5
Total . .	137,602	155,248	294,850	47·3	52·6
Devon . .	269,583	297,515	567,098	47·5	52·5
England . .	10,223,558	10,735,919	20,959,477	48·8	51·2

prosperous the season is, the more numerous are the marriages. This truth, through the changing vicissitudes of a long series of years, has been adequately and largely tested, and so minute are the influences, that it is even found (8th Report of Registrar-General) the price of wheat has its effect on the relative amount of marriages by banns or by licence,—the former, when wheat is dear, being proportionately less.

The marriages in South Devon amount annually to an average of 7 in 1,000 of the population.* This is below the average of England, which is rather more than 8 in every 1,000; hence, while in England there are 16 persons annually out of every 1,000 who marry, there are only 14 in South Devon.

This is a very considerable difference, and would argue not a very prospering condition of the population.

In ancient times, wars, pestilences, and famines kept down population. Improved manners and customs have very much obviated these sources of human destruction, and there now remains but little else than the prudential restraint of marriage to keep the population down to the level of actual subsistence.

* Registrar's Districts.	MARRIAGES IN SOUTH DEVON.									
	Annually in 1,000 living.	Signed Register, with mark.				Married under twenty-one years of age.				
		1848.		1858.		1848.		1858.		
		M. per cent.	F. per cent.	M. per cent.	F. per cent.	M. per cent.	F. per cent.	M. per cent.	F. per cent.	
Honiton . . .	5·9	26·2	33·7	37	31	4·1	8·2	5·3	14·3	
St. Thomas . . .	5·9	17·8	25·0	21	25	1·2	8·1	2·6	12·5	
Exeter . . .	13·1	14·3	24·1	15	21	2·6	8·3	5·1	10·0	
Newton Abbott . .	7·2	23·7	34·5	21	22	2·3	8·0	3·6	11·6	
Totnes . . .	7·0	32·1	33·4	23	20	3·7	15·7	4·6	13·6	
Kingsbridge . . .	5·1	31·4	37·0	28	26	3·9	17·3	6·7	18·4	
Okehampton . . .	5·9	36·2	47·8	33	38	2·9	11·5	4·9	16·5	
Crediton . . .	5·7	39·3	57·3	45	35	2·6	9·3	5·1	17·3	
Tiverton . . .	6·1	37·7	21·8	32	32	4·1	9·4	4·0	10·2	
Total . . .	7·0	26·3	31·1	24	25	2·9	10·1	4·4	12·1	
Devon . . .	7·3	26·6	36·7	24	29	2·6	9·1	4·5	14·5	
England . . .	8·1	31·2	45·4	27	37	4·4	14·0	5·8	18·3	

In the towns the proportion of marriages is far greater than in the country. In Exeter, the annual proportion to the population is rather more than 13 to 1,000 (13·1); Okchampton less than 6 (5·9). This doubtless is partly due to the more prosperous state of the town population, partly to its containing a larger proportion of females, and partly to the accidental circumstances of many marriages taking place in the towns that should legitimately have been solemnized in the country.

The mode in which the marriage ceremony is certified also permits this rite to be a fair test, if not of the amount of education, of the amount of a want of it among the population, as the incapability of attesting the record by signature indicates an ignorance in its first principles.

In 1848, in England, the average proportion of those married incapable of writing was 31·2 per cent. of men, and 45·4 of females. In South Devon it was 26·3 per cent. of men, and 31 of females; so that it may be inferred education was then more diffused here than in the kingdom generally.

The marriage returns of 1858 show a further advancement in South Devon in this respect. The proportion incapable of writing their names is, of males, reduced to 24 per cent., and of females to 25 per cent. The education in the intervening ten years has therefore told on the capabilities of the population of this portion of the county, 8·4 per cent. more of the people writing than were previously able to do so. The improvement in the females is relatively greater than in the males;—6·1 per cent. of the former and 2·3 per cent. of the latter can now read and write more than formerly.

The improvement in the county of Devon and in the whole of England is proportionably as great, and shows a considerable diminution in those uninstructed in the first rudiments of education.

Though this deficiency in elementary education, as above set forth, is still great, it is yet reasonable to conclude every succeeding year will show it to be very rapidly diminishing; for the results of the widely-spread education provided by the

country are not only becoming manifest, but there is the advantage to be derived from there not being the same number as formerly of untaught parents producing children. Those educated will not bring up their children in ignorance.

The marriage returns also show another point of interest, which is, the amount of those marrying under twenty-one years of age. Without entirely concluding these to be improvident marriages, they are verging upon it. The proportion of these in South Devon is considerably less than the average of the kingdom, but shows a tendency to increase; they were more in 1858 than in 1848. This tendency to an increase in early marriages appears to be general. The proportion in all England is much larger than it was formerly.

BIRTHS.—The births in South Devon amount annually, on the average, to rather more than 28 to every 1,000 living. This is an amount much below the average of England, which is 32·9.*

The males born are slightly in excess of the females. It was shown in a previous page (p. 162) that the census exhibits

* Registrar's Districts.	BIRTHS IN TEN YEARS IN SOUTH DEVON.					
	Births in ten years, 1847—1856.			Proportion annually to 1,000 living.		
	Males.	Females.	Total.	Males.	Fem.	Total.
Honiton . . .	3,377	3,192	6,569	14·1	13·4	27·5
St. Thomas . . .	6,610	6,478	13,088	13·5	13·2	26·6
Exeter . . .	4,435	4,173	8,608	13·5	12·7	26·2
Newton Abbott . . .	8,082	7,740	15,822	15·4	14·7	30·2
Totnes . . .	4,898	4,683	9,581	14·3	13·8	28·1
Kingsbridge . . .	3,235	3,035	6,270	10·3	9·6	29·3
Okehampton . . .	2,950	2,886	5,836	14·4	14·1	28·6
Crediton . . .	3,088	3,044	6,132	14·2	14·0	28·2
Tiverton . . .	5,537	5,330	10,867	13·9	13·4	27·4
Total . . .	42,212	40,561	82,773	14·6	14·0	28·0
Devon . . .	—	—	—	14·5	14·0	28·0
England . . .	—	—	—	16·7	16·2	32·9

the females living to preponderate over the males. This discrepancy is to be accounted for, partly by the greater emigration of the male sex, and its occupation on foreign service, but mainly in the greater risks to life experienced by the male over the female, so that the mortality of the former is greater than that of the latter (1·2 in 1,000 annually, *i.e.*, 19·6 of males, 18·4 of females).

The relative proportion of births in the different districts is greatest where the population has prominently increased, and least where it has fallen off. Exeter, which is essentially a town district, being equally low as the agricultural districts, would, however, argue that locality has but little to do with it. That the disproportion is rather due to other and extrinsic causes, probably partly to emigration amongst that class of the people who are young and in the prime of life, and partly to adverse circumstances repressing a tendency to marriage.

DEATHS.—The proportion of deaths to the population, both in the county of Devon and in South Devon, contrasts favourably with those of all England. In this latter the annual average is 22·3 in 1,000, while in Devon it is 19·8, and in South Devon 19 only.*

* Registrar's Districts.	DEATHS.							
	Deaths in ten years.			Deaths annually to 1,000 living.			Excess of deaths over 17 per cent. in ten years.	
	Males.	Females.	Total.	Males.	Fem.	Total.	per cent.	In whole population.
Honiton . . .	2,035	2,273	4,308	17·8	18·3	18·0	1·0	255
St. Thomas . .	4,343	4,596	8,939	19·1	17·6	18·3	1·3	642
Exeter . . .	3,679	3,928	7,607	25·4	22·4	23·9	6·9	2,028
Newton Abbott .	4,917	5,124	10,041	20·3	18·2	19·2	2·2	149
Totnes . . .	3,159	3,366	6,525	19·9	18·4	19·1	2·1	432
Kingsbridge . .	1,933	1,883	3,816	18·6	17·1	17·8	0·8	182
Okehampton . .	1,735	1,708	3,443	16·8	16·8	16·8	—	—
Crediton . . .	1,763	1,923	3,686	16·3	17·5	16·9	—	—
Tiverton . . .	3,834	3,877	7,711	19·6	19·3	19·4	2·4	976
Total . . .	27,398	28,678	56,076	19·6	18·4	19·0	—	7,859

On looking at the several districts, it appears that density of population greatly influences the relative amount of mortality ; that in the sparsely inhabited districts of Okehampton and Crediton the rate of mortality is small, and even below that average which may be considered sound and healthy, while in the more densely inhabited districts the average is far greater. In Exeter this is conspicuously seen, having an annual rate of mortality so high as 23·9 in every 1,000 of those living. This indicates a rate of mortality which is excessively high. Assuming the annual rate of 17 in 1,000 to be the fair average rate for a healthy population favourably situated, there have died in the ten years 2,565 beyond the number that should have ; and, by the same mode of computation, in the whole of South Devon, 7,859.

From the difference in the rate of mortality in the several districts of town and country, there is this moral to be drawn—that, in the former, however high may be the remuneration for man's labour, and however increased may be his intellectual and material enjoyments, in the latter is more health and longer life.

CHAPTER VII.

DISEASES OF SOUTH DEVON.

IN the preceding chapter the rate of mortality of South Devon has been set forth. By way of further illustrating the effects of the physical conditions proper to, and characteristic of this district, the diseases occurring in it will now be referred to.

In common with other parts of England, South Devon has been liable to epidemical influences. In the published annals of the county, mention is not unfrequently made of the occasional infliction of plagues and sicknesses. Save that these were attended by very notable mortality, little in reference to them that is characteristic or defined has been detailed.*

* It may not be uninteresting to bring together the notices of these epidemics, vague and indefinite though they be.

1233.—“A great plague of pestilence here [Exeter] happened, which continued three years together.” (Izacke’s “Antiquities of Exeter,” p. 9.)

1316.—“There was a famine, which ended in pestilence.” (Jenkins’ “History of Exeter,” p. 59.)

1348.—“With the greater part of Christendom our city had to experience the frightful ravages of the disease called the Black Pestilence. Its progress from India was marked with desolation to man and beast. From France it travelled to Southampton, at Michaelmas; it soon reached Winchester, the coast of Dorset, Bristol, and thence was imported into this diocese. The episcopal registers here show its wide wasting fatality among the population, and especially in religious communities. Of the numbers swept away by this disastrous visitation within the city, we have no means of discovery; but we well know that it arrested the building of the Cathedral nave, that it paralysed our woollen trade and all commercial enterprise, and suspended agricultural pursuits; and that its effects weighed heavily on our population for upwards of three years.” (Oliver’s “History of Exeter,” p. 74.) Jenkins says (p. 63), “It nearly depopulated the city, insomuch that the cemeteries could not contain the dead bodies, and therefore they were greatly enlarged;” and the prices of

Within my own personal observation many epidemics and much change in the type of disease has taken place.

provisions were so reduced that a fine ox was sold for four shillings, the best cow at one shilling, and the best hog at sixpence.

1361.—“The black death burst out again, but in a mitigated form.” (Oliver, p. 74.)

1373.—“The plague of pestilence entered this city, chiefly occasioned through excessive heat.” (Izacke, p. 61.)

1379.—“The city, by reason of a great plague, was left almost destitute.” (Izacke, p. 62.)

1389.—“A great number of people here died, the city being infected with the plague.” (Izacke, p. 64.)

1398.—“The plague again made ravages in this city, and swept off a great number of its inhabitants.”

1479.—“A great pestilence raged throughout the kingdom, from the beginning of September, 1479, to the end of November, 1480, which swept away an incredible number of people in the cities of London and Exeter (preceeded by famine, 1478).” (Jenkins, p. 85, and Izacke, p. 90.)

1485.—“This year an unheard-of disorder visited the nation, termed the ‘sweating sickness;’ it rapidly spread itself, and carried off multitudes, particularly in this city. In consequence of this epidemic the barber surgeons were incorporated, under the seal of the city.” (Jenkins, p. 90.)

1503.—“The plague of pestilence reigned excessively, wherein Robert Newton, 9th May, and John Daneston, 25th August, both of them mayors successively, John Garrott and John Nordon, bailiffs (amongst a multitude of others), here died.”

1535.—“Here died a multitude of people, through the infection of the plague.”

1569.—“The plague reigning here, the chiefest men of the city removed into the country, with their families.”

1585.—“At Lent assizes, held at the Castle of Exeter, there were certain prisoners arraigned before Sergeant Flowerdby (one of the judges of assizes for this western circuit), when suddenly there arose such a noisome smell from the bar, as that a great number of the people then present were therewith infected, whereof in a very short space thereafter died the said judge, Sir John Chichester, Sir Arthur Basset, and Sir Bernard Drake, knights; Robert Cary and Thomas Risdon, Esqrs., justices of the peace, and then sitting on the bench, and eleven of the jury impanelled and sworn for the trial of the said prisoners at the bar, and the twelfth man only escaped. The cause of the sickness was said to be thus: Sir Bernard Drake, having been at sea, took a Portuguese ship, which had then hovered up and down a long season, insomuch that the merchants and mariners therein, by diseases (chiefly occasioned through want of victuals and necessaries) were all worn out. These men he brought into Dartmouth, and caused them to be sent to the gaol near Exeter Castle, with which contagious disease all persons therein were soon infected (most of them died), and no less both city and country.” (Izacke, p. 138.) Jenkins’ account (p. 126) is a little more particular: “This disorder spread itself through the city and surrounding country, proving fatal to numbers. This assize, from the consequences attending it, was called the ‘black assize.’ The sickness was supposed to have originated from some Portuguese seamen, whose ship being taken by Sir Bernard Drake, on her voyage from Newfoundland

1825.—Inflammation of the serous membranes was in this year exceedingly prevalent; peritonitis, in its severest forms,

(laden with fish), the crew, in number thirty-eight men and boys, were sent to the gaol, near Exeter Castle; and being greatly emaciated (from a long voyage and want of provisions), and confined in a stinking dungeon, having no change of apparel, and lying on the damp ground, they infected one another; and no proper care being taken of them, the most part sickened, and many died. The infection was soon communicated to the other prisoners, and few of them escaped the fatality of the disorder. These unhappy foreigners were ordered to be brought for examination before the justices; but being reduced by famine and sickness they were unable to stand, and therefore were carried by men, on hand-barrows, to the court, where they excited the commiseration of the spectators. Proper care was then taken, and the survivors were sent to Portugal."

In consequence of this frightful visitation the assizes were held for a time in other places. For the transaction of special business the justices were allowed to assemble in the Chapter-house. The then county gaol is described as a "living tomb—a sink of filth, pestilence, and profligacy." (Oliver, p. 190.)

1591.—"At Tiverton the plague, said to have been introduced by a travelling peddler, so raged, that out of 5,000 persons 550 died." (Harding's "History of Tiverton," p. 36.)

1603.—"The plague having entered this city, a pest-house (for the better succour of persons infected herewith) was provided near the said city, by the special care of the magistrates hereof."

1624.—"The plague again visited this city (Exeter); its beginning here was in the month of July, and it continued its ravages for the space of a year, cutting off whole families, and leaving the city almost destitute of inhabitants." (Izacke, p. 150; Jenkins, p. 135.)

1625.—"The plague continuing to rage, Thomas Walker, Esq., who had been elected mayor, refused to take the office, through fear of the disorder, and retired into the country; but his deputy alderman, Ignasius Jourdain, nobly remained to do his duty. A petition was, however, sent to the King, who, by his letter, commanded the said mayor to undertake the office, on his allegiance, which he accordingly did, and executed it to the satisfaction of his fellow-citizens."

Lady Bevell Grenville, who had come up from Stow, in Cornwall, to visit her mother, Lady Grace Smythe, of Great Matford, in Heavitree Parish, writes thence to her absent husband, on the 20th August, 1625:—"The sickness increases here, and is much dispersed abroad in the city; and when it comes it goes through the house, and ends all. I am determined to leave to-morrow, on account of the children. Mrs. Bampfylde is gone, and her children; and Mrs. Isaac is gone from Polslow, &c., with sons and daughters, &c., and all the citizens that can possibly get horses do remove."

1644.—"In October the town of Tiverton, and particular West Exe, was visited by another fatal disorder, called the 'sweating sickness,' of which more than 450 persons died: 250 of that number were buried in the months of August, September, October, and November; and 105 in October only. From this and other causes Tiverton became almost entirely deserted." (Harding's "History of Tiverton," p. 60.)

1646.—"The plague occurred in many parts of the county. At Tiverton more than 250 of the inhabitants were struck off. The distress at Tiverton must have been very severe, for an order of the House of Commons (24th May,

was of common occurrence; and, amongst children, hydrocephalus was so frequent as really to justify its being styled an epidemic.

1646) is made, calling on the parishes within the bills of mortality to make a 'free and charitable contribution' for the poor of Tiverton and Culliton, 'in respect of the hand of God in His visitation being upon them.' This pestilence also prevailed at Barnstaple. It first broke out at Bideford, where, in June, a vessel from Spain, laden with wool, having landed her cargo at the quay, it diffused itself in so shocking a degree that in a few weeks the houses were filled with horror, and the streets covered with grass. Some children who had been playing on the wool sacks were the first who caught the infection. The progress of the disease, according to the parish register, was as follows:—From June 8 to end of the month were buried 18; in July, 58; in August, 83; in September, 38; in October, 19; in November, 2; in December, 9; in January, 2. The register dates the commencement of the malady June 8, and ends it January 18. The greatest number buried in a day were seven."

1741.—The county gaol appears a second time to have originated severe sickness. The *Northampton Mercury* of 13th April, copying from the *London Gazette* of the time, says—"We hear from Exeter that at the assizes there was such a sickness among the prisoners that half were not able to appear on their trials; and those that did were brought to the bar single, having first been stripped of their clothing, washed all over with vinegar, and then fresh clothes put on them." "A most fatal epidemic, called the spotted fever, prevailed in the town of Tiverton, of which 636 persons died, or nearly one-twelfth of the whole population, which was then calculated as rather under 7,000 souls." (Harding's "History of Tiverton," p. 109.)

1743.—"In consequence of the gaols being so crowded, a most fatal disease had been generated, of which 100 died in one prison in Exeter in the space of a year, and which killed thousands in the county (as set forth in a petition from Halberton) between Taunton and Exeter, particularly at Tiverton, in which town 700 died in fifteen months, and the parish was at the expense of 500 coffins." (*Gentleman's Magazine*, Harding's "Tiverton," p. 110.)

1775.—The influenza occurred as a general epidemic. The first case that occurred in Exeter was on the 8th of November, and lasted about seven weeks.

1782.—The influenza again was a widespread epidemic. It commenced in South Devon on the 23rd of May, and again lasted about seven weeks. These epidemics will be more particularly referred to in a subsequent page.

1791.—"At Stoke (in which the doek is included) 800 people died of the small-pox within one month in this year." (Polwele, p. 328.)

During these pestilential visitations provision appears to have been made for the indigent, by providing "pest-houses." 1603.—"For the better succouring of the persons infected therewith (the plague), a pest-house was provided near the city, by the special care of the magistrates." 1625.—"A pest-house was established near Lion's Holt, in the parish of St. Sidwell." (Oliver, p. 109.) 1664.—"A pest-house near the city, for the benefit of the inhabitants (in case the plague should happen amongst us), was purchased, and much improved by building." (Izaak, p. 170.) Contributions, in money and kind, were also afforded to other places similarly affected. "It is pleasing," says Dr. Oliver (p. 109), "to witness the enormous sacrifices which our fellow-citizens made to benefit the sick in other places, as the infection was propagated. Plymouth

1826.—Numerous cases of a fatal phlegmonous erysipelas occurred.

1828.—During the summer season dysentery prevailed.

1829.—In the autumn, English cholera occurred in its most urgent and rapid forms, and was attended by a very signal mortality. Nervous diseases of a grave character also prevailed during the year; there were numerous cases of epilepsy and paralysis, and croup was very fatal.

1830.—Spasmodic diseases of the chest, as asthma, croup, and whooping-cough, were very prevalent—the two latter in the summer season. Many cases of typhus also occurred during the year.

1831.—Influenza prevailed epidemically, and was severe in some of its forms.

1832 was conspicuous, during the months of July and August, for the prevalence of the Asiatic cholera. In 1834 influenza again occurred. In 1836, small-pox; followed in 1837 by whooping-cough, and then by scarlet fever: each of these infantile diseases, during this period, was very fatal in its consequences. In 1837 influenza again prevailed; it was very general, and attended, as was the case throughout England, with a severe and painful series of symptoms. In the spring of 1838 a peculiar form of spotted fever occurred. In 1844 and 1845, besides scarlet fever there were many cases of erysipelas and puerperal fever. In 1847 typhoid fever and scurvy prevailed. In 1849 the Asiatic cholera occurred epidemically. 1858, scarlet fever was very prevalent, followed in 1859 by small-pox. Nervous diseases, and many deaths therefrom, were also frequent during this year. 1860, measles, small-pox, and diphtheria occurred. 1861, small-pox, and in 1862, typhoid fever and measles.

acknowledged to have received from Exeter, in the winter of 1626, the sum of £92 11s. 5d.; Salisbury, in the following year, £40; Cambridge, in 1630, £45 10s.; Barnstaple, £65 8s. 0½d.; Taunton, £40 in August, 1640, and later, the large sum of £185 17s. 4d. in money, besides corn, &c., to the value of £6; and in 1664 many hundred pounds were here collected, and sent to London and other towns infected with the plague of pestilence, towards the better relief of the poor therein."

These various epidemics will be more particularly mentioned when the several diseases are referred to.

The general aspect or type of disease has, within my own observation, partaken of two very separate and distinct characters. During the few years immediately preceding 1828, the tendency of disease was to be inflammatory, having a sthenic or phlogistic character. The serous membranes were then very prone to become the seat of active disorder; thus cases not unfrequently presented themselves of pleuritis, peritonitis, and, amongst children, of hydrocephalus, all exhibiting a type of disease requiring the most prompt and occasionally persevering phlogistic treatment. Since that period, however, the aspect of disease has materially changed. It has become essentially adynamic or asthenic, while diseases of serous membranes have given place almost entirely to those affecting parenchymatous structure, or the mucous membranes; and these have required a medical treatment rather mild than heroic: experience soon showed that the type of disease had changed, and that the method of cure previously requisite was now anything but applicable. In fact, while thirty years ago diseases generally, not only bore, but required free evacuation by bloodletting, aperients, &c., latterly this method of treatment has not only been contraindicated, but would, if adopted, have been promptly followed by fatal results. Of this occasional alteration in the type of disease an illustration may be offered, which is not only interesting in itself, but bears testimony to that which prevailed seventy years ago, being then somewhat of the same character as that now prevailing. My friend and preceptor, the late Mr. Benjamin Johnson, Surgeon of Exeter, a man remarkable for sagacity and powers of observation, whilst bleeding a patient freely in 1820, observed to Mr. Woodman, then his pupil, now a medical practitioner in this city, that "if one had bled thus thirty years ago, every patient would have died."

The seasons exercise, as might be supposed, a very notable effect on the nature and tendencies of disease. From a care-

ful analysis of the causes* of 3,368 deaths, occurring in five years in the city of Exeter, it appears that in the first and second quarters of the year diseases of the respiratory organs and of the nervous system are the more prevalent affections, and in the third and last quarters, zymotic diseases and affections of the digestive organs ;—

That, looking to the several classes of disease, the larger proportion of zymotic diseases occurs during the summer and autumn quarters ; those of uncertain seat are at their minimum in the second quarter, and gradually increase through the third and fourth quarters till the first quarter, when they are at their maximum ; nervous affections, diseases of the respiratory organs, and of the circulating system, are relatively most fatal during the first and second quarters ; diseases of the digestive organs in the third quarter ; and urinary and uterine diseases in the fourth and first quarters ;—

That, as regards mortality, the greater number of deaths occur during the winter season, and that of all the months January is by far the most fatal. The months in which the fewest deaths occur are February, June, and November, the intermediate months being characterized by an increased mortality.

* The Mortality per cent., in the city of Exeter, from all classes of diseases, in each of the four quarters of the year.												
	1st Quarter.			2nd Quarter.			3rd Quarter.			4th Quarter.		
	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.	M.	F.	Total.
Zymotic . . .	0.49	0.52	0.51	0.34	0.46	0.41	1.00	0.91	0.95	0.82	0.62	0.71
Uncertain . . .	0.50	0.47	0.48	0.36	0.29	0.32	0.33	0.49	0.42	0.32	0.37	0.35
Nervous . . .	0.47	0.38	0.42	0.47	0.35	0.40	0.38	0.21	0.28	0.36	0.29	0.32
Respiratory . .	1.31	0.82	1.04	1.15	0.80	0.95	0.83	0.64	0.72	0.80	0.54	0.66
Circulation . .	0.06	0.03	0.04	0.05	0.03	0.04	0.05	0.01	0.02	0.03	0.04	0.03
Digestion . . .	0.15	0.12	0.13	0.18	0.16	0.17	0.23	0.11	0.16	0.22	0.10	0.15
Urinary . . .	0.02	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.00	0.01
Uterus . . .	0.00	0.06	0.03	0.00	0.02	0.01	0.00	0.02	0.01	0.00	0.05	0.03
Locomotion . .	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00
Integuments . .	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Old age . . .	0.33	0.52	0.43	0.23	0.26	0.25	0.13	0.27	0.21	0.25	0.40	0.33
Violent . . .	0.10	0.02	0.00	0.07	0.03	0.05	0.06	0.04	0.05	0.05	0.03	0.04
Not specified . .	0.02	0.04	0.03	0.02	0.08	0.02	0.06	0.06	0.06	0.01	0.05	0.03
Total . . .	3.53	3.02	3.25	2.94	2.48	2.68	3.10	2.82	2.69	2.92	2.54	2.71

The table appended * shows the relative amount of mortality in each month.

By a comparison of the mean monthly mortality with the recorded average climate of each month, it may be inferred that the weather the most congenial to life in this district is that which, being somewhat above the mean in temperature, is the most free from sudden changes. Were it not for the occasional occurrence of summer epidemics, inducing an accidental high rate of mortality (and this chiefly in children) in August and September, it would also appear that from April to November, the warm and calm period of the year, there is a uniform healthiness, and that the cold months, from December to March, constitute more particularly the period of fatal disease.† This bears out a general conclusion, formed on some years' observation, that an equable temperature, accompanied by a warm moist atmosphere—the “muggy” weather of Devonshire—is congenial to health, while dry easterly winds, with a variable temperature, are injurious to it. Nevertheless, this latter is the weather which is styled and considered healthy by the hale and robust, who have strength and energy to enjoy it.

As general conclusions, it may be stated that the winter season is the most injurious to life in the aggregate, that March and January are the most fatal months to those advanced in years, and that infants and children are more fatally influenced during the heats of summer.

The diseases of this district, as they have occurred under personal observation, will now be considered, and, in doing so,

* Proportion of deaths that take place in each month out of every hundred that die annually.

	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Males .	5·2	4·1	4·5	4·4	3·4	3·5	3·8	4·2	4·0	3·7	3·5	4·0
Females	5·4	3·7	5·1	4·1	4·1	3·3	4·0	4·5	4·5	4·0	3·5	4·0
Total .	10·6	7·8	9·6	8·5	7·5	6·8	7·8	8·7	8·5	7·7	7·0	8·0

† *Vide* Report on the State of Exeter, Health of Towns Commission.

the arrangement and order suggested by the Registrar-General in his sixteenth Annual Report will be adopted. A comparative statement of some of the principal diseases,* as occurring in all England, in Devon, and in South Devon, deduced from the deaths that have taken place in the five years from 1856 to 1860 inclusive, is appended.

SMALL-POX.—On reviewing the diseases of the whole district, as set forth in the quarterly returns of the Registrar-General, it appears that, in common with the other infectious diseases, cases of small-pox are here or there always to be met with, but that occasionally it breaks out with great violence, spreading a fatal influence far and wide. The annual average of deaths in South Devon from this cause is 48, or about 16 to every 100,000 of the inhabitants. It has been less fatal here during the last

* The average annual mortality from the undernamed diseases.						
	In England. Population, 20,066,224 ; annual mor- tality per cent., 22.	In Devon. Population, 589,385 ; annual mor- tality per cent., 20.	In South Devon. Population, 294,850 ; annual mor- tality per cent., 19.	In 1,000 living		
				in Eng- land.	in Devon.	in South Devon.
Small pox . . .	3,854·0	122·2	47·8	0·19	0·20	0·16
Measles . . .	8,293·8	236·0	89·6	0·41	0·40	0·33
Scarlatina . . .	3,510·8	500·4	227·2	0·17	0·84	0·77
Diphtheria . . .	2,959·8	60·2	33·0	0·14	0·10	0·11
Whooping-cough . . .	9,708·4	219·6	93·8	0·48	0·37	0·35
Typhus . . .	16,063·8	459·2	232·8	0·80	0·76	0·78
Erysipelas . . .	1,870·8	52·2	26·4	0·09	0·08	0·08
Metria . . .	1,039·2	23·4	11·8	0·05	0·03	0·04
Childbirth . . .	2,055·8	53·2	25·8	0·10	0·09	0·08
Influenza . . .	1,291·6	56·2	29·4	0·06	0·09	0·09
Dysentery . . .	1,408·8	27·8	9·8	0·07	0·04	0·03
Diarrhœa . . .	15,378·0	262·0	93·8	0·78	0·44	0·35
Cholera . . .	759·8	14·0	4·4	0·03	0·02	0·02
Phthisis . . .	50,134·2	1,378·2	685·4	2·49	2·33	1·37
Lungs . . .	61,001·0	1,527·2	627·4	3·03	2·59	2·13
Violence . . .	14,227·2	353·4	167·0	0·70	0·59	0·56

N.B.—This table may be read, disregarding the decimal point, as the whole numbers to 100,000 living ; thus, out of 100,000 living in South Devon, 19 annually die of small-pox, &c.

five years than in the county generally, or in the whole of England.

It occurred epidemically in 1837, in 1841, in 1849-50, in 1853-4, and in 1858. In May and June, 1837, it was both very general and fatal. One case was peculiarly distressing—the lower jaw ulcered and sloughed away. The poor little boy lived a few days in this state. Probably this complication was due to a *cancrem oris*.

1841.—In October and November the small-pox assumed an essentially low type. The pustule rose, flattened in the centre, was waxy in appearance, and after the second day became of a dark colour; it but rarely filled out or followed the usual course. The breathing from the commencement was oppressed, and so continued; the pulse was quick and small, the thirst excessive, and, generally speaking, the continued moaning and crying of the younger sufferers indicated a considerable amount of uneasiness, if not of pain. These cases required support and stimulants; occasional doses of opium were highly beneficial; ammonia was always injurious, increasing excitement and distress, and apparently inducing a greater tendency to the formation of pustules, without promoting any beneficial change in the pustules themselves. Great numbers succumbed to the disease. Amongst those that recovered there remained much general debility, and an anasarea was not unusual; but, unlike the anasarca after scarlet fever, was not characterized by a coagulable urine.

1861.—Many cases during the autumn assumed a low type, with dark, ill-concocted pustules, but the disease was not so general as in 1841.

Several instances of secondary infection took place during these several epidemics; some of them were after previous inoculation, some after vaccination; the proportion of these latter to the whole number attacked, however, was not very considerable, certainly did not exceed one in twenty. Those cases which occurred after small-pox were for the most part severe, while those after vaccination were mild, and terminated favourably; in fact, after making every inquiry, it

appeared that no death took place under the latter circumstances.

Some few years prior to these dates, four cases of small-pox occurred in one of the large schools of the district; two were after vaccination, two were secondary small-pox after inoculation. These latter occurred in the only boys who had not been vaccinated. Though the whole of the cases terminated equally satisfactorily, numerically they tell in favour of vaccination.

It may be inferred that many cases which are styled secondary small-pox are really primary. There can be no doubt security is often placed in an imperfect vaccination. Parents, after the operation, not infrequently fail to submit the arms to the observation of the surgeon. If a pimple or imperfect vesicle rise, it is deemed sufficient. Moreover, vaccination is at times made to bear more ills than are due to it; for though, at these periods, the cases which occurred after vaccination were doubtless the true varioloid disease; yet it may be as certainly assumed that, at other times, many affections, such as were formerly placed to the account of swine-pox, chicken-pox, &c., are often considered to be secondary small-pox.

Though vaccination may not have the many detractors it used to have, still there remains some prejudice against it, or at any rate an apathy towards its adoption, so that if small-pox be not in the neighbourhood, there is difficulty in inducing the general public to have their children vaccinated; when there is no pressing danger, carelessness and opposition interfere with its adoption. This latter exists more amongst the men than with their wives. Many instances have occurred where the women evinced the greatest anxiety about it, but were thwarted in their wishes by their husbands. Should, however, danger make its appearance, by small-pox breaking out, then numbers anxiously solicit gratuitous vaccination: * sometimes it is re-

* Subjoined are the numbers vaccinated at the Exeter Dispensary, gratuitously, during the years named; 1834 and 1841 were seasons of the epidemical occurrence of small-pox.

Years.	Numbers Vaccinated.
1834	614
1835	525

quested, at the same moment, for five or six of one family ; evidence very sufficient of previous neglect.

The objections commonly urged against vaccination are, that it interferes with the will of God, introduces into the human frame a brute disease, and that it induces a tendency to eruptions. There can be no doubt that cases do occur giving countenance to this latter objection, notable and very striking instances having presented themselves ; but they are of such very rare occurrence as in no way to militate against its general usefulness.

Vaccination has been occasionally employed after infection from small-pox has taken place, and with the result of modifying and alleviating the natural disease. Under the neutralizing influence of the vaccine lymph it may be inferred, in some cases, the small-pox was lessened in intensity, and in others became varioloid.

Re-vaccination is often resorted to ; I have watched its progress in a great many cases, and, where satisfied of a previously efficient vaccination, have *never* seen it go through a regular progress, or present a vesicle from which lymph ought to be taken. It often set up considerable inflammation, and a diffused eruption, chiefly of an erysipelatous character. Nevertheless, the weight of authority is in its favour.

Liebig, judging from the analogous action of a low yeast, states * “ that the susceptibility of infection by the virus of human small-pox must cease after vaccination, for the substance, to the presence of which this susceptibility is owing, has been removed from the body by a peculiar process of decomposition artificially excited. But this substance may be again generated in the same individual, so that he may again become

Years.	Numbers Vaccinated.
1836	430
1837	461
1838	510
1839	515
1840	502
1841	615

* “Organic Chemistry,” p. 389.

liable to contagion, and a second or third vaccination will again remove the peculiar substance from the system." The general conclusion now arrived at is, that re-vaccination for entire protection should be resorted to every seven years. Nevertheless, considering the above, and also that it is problematical if, after an efficient primary vaccination, true small-pox ever occurs—on the contrary, however distant the period, a modified small-pox only—the conviction presses itself upon me that the chief value of re-vaccination is as a test of the efficacy of the previous vesicle. In this respect it appears to be eminently useful, and by no means to be neglected where the slightest doubt is entertained. This test, however, must be regarded as incomplete, unless there be present very sensible evidence of the specific virus being absorbed, as indicated by the formation of an irregular vesicle, attended by a certain degree of surrounding inflammation. If no effect follow the insertion of the virus, grounds sufficient are not offered for affirming that the patient resists the infection in consequence of the previous operation. Thus an imperfect attempt not only lulls into a false security, but, by the possible occurrence of small-pox, throws undue discredit upon the protective power of vaccination.

From the common severity of the cases of secondary small-pox occurring in those who have had small-pox previously, whether from inoculation, or taken in the natural way, and from the comparative lightness of the varioloid after vaccination, it would appear that, granting every one vaccinated were to become the subject of varioloid disease, there yet is sufficient use and value in vaccination, as modifying and ameliorating the natural severity of the disease.

SWINE-POX, CHICKEN-POX, &c.—It was mentioned above that these affections were often mistaken for, and called, secondary small-pox; this happened in 1838, when a great number of these cases occurred in Exeter. They evidently, however, were not a modified small-pox; and in confirmation of it, during their prevalence, there was no case of true small-pox reported to be in the city. Nevertheless, it was currently affirmed that

such and such persons had the small-pox, and that vaccination had failed to protect them.

Recently, in a suburb of Exeter, there was a widely-extended epidemic of this nature. Though assumed and stated by some to have been a varioloid, it was not associated with any cases of small-pox; and in a boarding-school, where many cases occurred, no small-pox emanated from them.

It is stated, as a distinctive character of these affections, that they are not, as the small-pox or the varioloid, infectious. There are, however, good grounds for doubting this conclusion. In fact, their general history proves the contrary, for these eruptions will consecutively run through the whole of the junior members of a family.

As the occurrence of these affections does not protect the system from the influence of small-pox, it becomes a matter of much practical utility to ascertain the differences between their several eruptive characters. In swine and chicken-pox, the central depression so characteristic of small-pox and the varioloid is wanting. They preserve throughout their course a lenticular or conical shape.

MEASLES.—The deaths from measles are, in this district, numerically more than from small-pox. In South Devon, in five years, the deaths from measles were 896, from small-pox 478; and about the same relative proportion has marked the mortality from these diseases, both in Devon and in all England. Considering the popular estimation of the fatality of these two diseases, this is a result scarcely to have been anticipated, especially when it is borne in mind that measles often originates other and fatal diseases.

Measles occasionally prevails extensively. This was the case in 1831, in 1836, in 1851 and 1852, in 1856, through 1857 to 1858, and finally in this present year 1862. In 1831 the cases which occurred were mild, in 1836 it was a widely-extended epidemic; many of the cases were of a malignant character, and numerous deaths ensued. This was also the case in 1857. Though the recurrence of this disease does not appear to belong

exclusively to any particular weather or season of the year—for it breaks out indiscriminately at all seasons, whether these be dry or moist, hot or cold—yet winter and spring have been the periods of its severer forms. It is then often associated with a severe form of bronchitis, may be of pneumonia, and membranous inflammation of the nose and fauces, so that a distressing ichorous discharge takes place, independently of the sputa which occur during the development of the pectoral symptoms. These, expectorated in nummular masses of a greyish colour, are usually observed floating in an abundant albumen. Amongst the poorer classes the after effects are often very severe, those the most so being coughs and general affection of the chest, inflammation and suppuration in the auditory passages, and general weakness of the constitution, showing itself in glandular affections, and diarrhœa. During these epidemics, cases of secondary measles were not unfrequent, especially if the first attack had been slight.

In 1836 the eruption was, in some of the more malignant cases, so intense in colour, with so much heat, and so extensively diffused and continuous, that it became at times extremely difficult to discriminate between it and the rash of a scarlet fever. Generally, however, the gyrations or ereseentie form of rubeolous eruption was discoverable.

In 1862 the eruption was very much raised upon the surface, with here and there papulous or even vesicular spots, which, had it not been for the coryza and pectoral symptoms, would have led to the diagnosis of an incipient small-pox. The expectoration in some cases was profuse, and not unlike the creamy discharge of a *peripneumonia notha*.

The period of incubation is apparently very short. It may, however, be protracted to more than a fortnight. In this present epidemic, of a family of six children, two had left Exeter for Suffolk. The whole of these children had measles within a few days of each other. The two in Suffolk had left Exeter upwards of a fortnight before they were attacked. In Exeter, measles was epidemic. There was none in the neighbourhood to which these two had journeyed. It may therefore be

assumed the period of incubation was more than a fortnight.

These several epidemics of measles have generally been accompanied by an epidemic of whooping-cough. They have been nearly always associated together, not as regards the individual, but as regards time. It is usual to hear of cases occurring simultaneously and amongst neighbours.

SCARLET FEVER.—During the last five years this disease has been very fatal in this district. The returns of the Registrar-General show a mortality considerably higher than either small-pox or measles; and the proportion in the whole county of Devon is slightly in excess of that of South Devon, while both Devon and South Devon are greatly in excess of all England (*vide antea*, p. 176). Scarlet fever has in recent years occurred in an epidemic form several times. In 1832 and 1833 there were many cases. It was also epidemic in 1837, in 1841 and 1842, with occasional fatal cases in 1843 and 1845; in 1849, in 1854, and it continued hovering about during the following years of 1855, 1856, and 1857. For years previously to 1832, scarlet fever had been mild in its character, and though at this date the general aspect of the disease may not have become urgent, yet it showed graver indications than had been observed for many years previously. In May and June, 1837, it was not only very generally epidemic, but assumed a peculiarly bad aspect. The cases were for the most part of the malignant kind, and accompanied by the worst form of sore throat; children in great numbers fell victims to its influence. During the continuance of this epidemic, which continued till the autumn, many differences from the more usual course of scarlatina were presented. The eruption may have come out in the natural way, have gone through its course, when, whilst presenting every appearance of convalescence, relapse has taken place, and the sore throat, together with the eruptive fever, again become re-established. At other times the eruption assumed so completely the character of measles, that, had it not been for the presence of sore throat, there would have been great difficulty in

distinguishing it. In some cases, again, it assumed the vesicular form, the whole surface being covered over with small vesicles; in others the scarlet eruption assumed a dull livid hue, and was interspersed with dark-coloured spots resembling, but not identical with, *petechiæ*. The fever, which usually set in with headache, vomiting, and rigor, on close questioning, had evidently been some two or three days preceded by sore throat.

In all these varieties of scarlet fever the countenance became pale and fallen; the throat swelled rapidly; the skin early lost the marked scalding character proper to this affection, and assumed a subdued colour; the pulse was small and rapid; a constant diarrhœa often supervened, of a most offensive nature; and, in the more urgent cases, convulsions, coma, and death ensued. Though apparently of an inflammatory character, yet the ordinary means—depletion, purgatives, and cold affusion, previously applicable, though in a mild form—appeared particularly hazardous; under such a course of treatment life seemed to vanish, so silently and rapidly did the vital powers subside.

For the relief of the diarrhœa or the occasional restlessness, the exhibition of opium, either in draught or by enema, appeared singularly inapplicable; certainly in cases where it was administered a fatal termination early took place. In fact, so disheartening was the result of the most varied methods pursued, that one was inclined to think treatment useless. Almost with this impression, certainly with a prejudice against it, I adopted Dr. Peart's plan of freely administering ammonia; and with the most complete success. Under its influence the patient cooled, the throat recovered its healthy appearance, the pulse its tone, and indeed subsidence of the more urgent symptoms quickly ensued. The promptness of relief thus afforded was also particularly serviceable, as counteracting the after lesions which so commonly take place in the throat, these rarely becoming confirmed until after the fifth day; so that ammonia may be regarded as a most valuable medicine in this disease when attended by putrid sore throat. In the previous

edition of this work, attention was directed to this treatment by ammonia, and it has since been extensively followed by others, and with similar success. Dr. Asmus even speaks of its beneficial use in the subsequent dropsy.*

The diluted nitro-muriatic acid freely administered also proved most useful, and in many cases appeared to cut short the fatal tendencies of the disease.

During the epidemic the number of deaths was very great; frequently two or three in the same family fell victims to its influence. The change, at this time, in the type of this disease was strongly impressed upon me by the dismay experienced, by one of the old and most judicious practitioners of Exeter, at the unexpected and rapidly fatal cases that occurred in his practice, and where previous experience had led him to anticipate little or no danger.

Towards the latter end of 1841 and the commencement of 1842, scarlet fever was again epidemic, and attended by the same low inflammatory character as in 1837: again the liberal use of ammonia was attended by beneficial results; not only were present symptoms relieved, but danger almost invariably arrested by its use: nor was there usually a protracted convalescence; it might be almost said that the patients stepped, as it were, immediately from the sick-bed into health.

During these epidemics the contagiousness of scarlet fever was most fully manifested; in fact, so intense was the power of this principle, that in houses where cases occurred, persons of mature age who had previously had it were attacked by an irritative fever accompanied by putrid sore throat: in some of these there was even an irregular efflorescence of the skin. A remarkable instance of the specific contagiousness of these sore throats occurred. A lady, visiting at Highgate, in the neighbourhood of London, there contracted a scarlatinous sore throat, but attended by no other symptom. She came to Exeter, and communicated to her own children the fully-developed disease. As illustrative of the persistency of its contagiousness, the

* "Epidemic Scarlatina in the Circle of Pillkallen, 1841-2." By Dr. Asmus. Berlin Medicinische Zeitung.

following is adduced. A young lady went through an ordinary attack of scarlet fever. Two months after perfect recovery, the propriety of her visiting distant relatives, where there were children, was canvassed, and ventured upon, with the assurance of perfect safety. In two distant houses where the visits were made, the scarlet fever broke out. There could be traced no other previous cases in either neighbourhood, so that the only conclusion to be arrived at was that the contagious principle had been retained and conveyed by this young lady. This occurred in the autumn and winter of 1840.

The late Dr. Blackall used to relate the following:—When practising at Totnes, he attended a young woman who died of malignant scarlet fever. Twelve months afterwards, in another neighbourhood, he visited a young woman, also in malignant scarlet fever. A resemblance between the cases struck him, when he was told they were sisters, and that only a few days before the clothes belonging to the dead sister had been unpacked and worn by the sister then ill.

The after effects of scarlet fever are not very prominent in this district. Though dropsy with coagulable urine here occasionally takes place, yet it is by no means so frequent as reported in other places, and never if there has been a free diuresis during the attack. When the urine was bloody as well as albuminous, the free use of gum-arabic water was signally useful, and alone appeared efficacious for relief. In the epidemic of 1842 and 1843, a case of dropsical effusion of much interest occurred. In the cold weather in February, a young lady, hereditarily predisposed to consumption, after an attack of scarlatina, became chilled; difficulty of breathing ensued, and in the course of a few hours increased to so urgent a sensation of suffocation as to alarm. It was soon detected that effusion was taking place, and that very rapidly, into the cavity of the pericardium. Percussion showed its almost momentary increase. In a few hours she succumbed to the disease. Were such another case to occur, the propriety of evacuating the fluid from the sac of the pericardium might reasonably be entertained.

Perhaps the most troublesome of the after affections of scarlet fever are the disorganizations of the internal ear, with their irritating discharges, and the enlarged state of the tonsils. For this latter affection there appears to be no cure but time; at least, no means that I have ever seen employed for the prompt dispelling of these indurated swellings have succeeded. It is an induration of a chronic kind, probably due to some inflammatory deposit, and requiring a process of absorption for its dissipation; but this process is not to be induced by ordinary means. After the lapse of some time, may be of years, nature effects it, but the how and the when is difficult to say. On an examination it is found to be gone, and the tonsils have resumed a normal condition. With regard to the injury to the ears, tonic diet and counter-irritation behind the ears often effect much; occasionally the hydriodate of potassa appears useful; good effects also often follow the local application of iodurate of lead ointment warmed and dropped into the ear. After the use of ammonia, however, the subsequent effects of scarlet fever are far from frequent, forming the exception rather than the ordinary course; not so after mercury. During these epidemics mercury appeared to act injuriously, and immediately to set up glandular irritations.

ANGINA MALIGNA has been concurrently epidemic with scarlet fever, and doubtless this disease, as described by Fothergill and Huxham, and as seen in recent years, is nearly allied to, if not identicall with, the malignant scarlet fever, there being many symptoms in common. The ingressing fever was observed to be of the same overwhelming character, and attended by swellings of the glands and tissues about the fauces. These swellings rapidly increased, and exhaled a sickly fetor. Though these swellings were diffused over a large surface, there was not that marked difficulty of swallowing, or stridulous breathing, so characteristic of a quinsy; nevertheless they were indicative of the greatest danger. A symptom which frequently occurred, and is noted by Huxham in his account of the epidemic at Plymouth in 1752, is the scalding

sensation communicated to the finger when touching the sick person. This disease, whether it terminated in recovery or death, usually ran its course rapidly.

DIPHTHERIA AND CROUP are with difficulty separated from angina maligna, and consequently from scarlet fever. Omitting all reference to the theories of disease, and regarding solely facts and appearances, experience shows that the symptoms of each of these affections are in many respects identical, and their occurrence often simultaneous; nevertheless, we must regard them as separate diseases.

DIPHTHERIA was epidemic in 1838. In 1843 some few cases occurred. In the epidemic of 1859 and 1860, the plastic inflammation was in some cases very severe, and the amount of false membrane considerable, and frequently reproduced. In the case of a young woman of about twenty years of age, a perfect cast of the posterior fauces was thrown off, and without leaving any eschar. The most fatal cases were those where the larynx became affected, or where hæmorrhage occurred, after destruction of the tissues of the fauces. It spread evidently by contagion, but those living in low swampy situations were most prone to its attacks, and it was there most fatal. In some cases it was very protracted, and false membrane was again and again formed and separated.

CROUP occurred epidemically in 1825, 1827, and 1831, and was occasionally met with as a characteristic symptom when diphtheria prevailed. Croup, as well as the other allied affections, is remarkable as occasionally occurring epidemically, with long intervals intervening between its reappearance.

WHOOPIING-COUGH occurs only epidemically; though generally a mild disease, yet at times it assumes a character of great severity. This was particularly the case towards the latter end of 1833 and the beginning of 1834. A large proportion of the children so afflicted spat up blood in the efforts of coughing;

some died during the attack, and many lingered on with organic affections of the chest, thus aroused into action. In 1847 it again occurred, as also in 1852, 1853, 1856, and 1861, and now in 1862.

It occasionally occurs that those who are advanced in years contract a spasmodic cough without the peculiar "chink" so characteristic of it in the young. This markedly occurred in the epidemic of 1847. The mortality from this disease is considerable; during these last five years in South Devon the annual average number of deaths amounts to (93·8) nearly ninety-four. Large as this number is, the proportion is slightly less than that of Devon, and very considerably less than that of all England.

Measles appears to predispose to whooping-cough. So almost universally has an epidemic of the former been associated with or followed by the latter, that it is not altogether unreasonable to suppose the debility thus engendered has a peculiar influence in rendering the system amenable to the spasm of whooping-cough.

FEVER.—This district is not peculiarly liable to fever, save where accidental local circumstances generate it. This has been peculiarly evidenced in Exeter. Fever, that is of the typhoid or intermittent type, now rarely occurs, while only a few years since typhoid fever was very prevalent. The annual proportion of deaths from fever in South Devon is 78 in 100,000, in Devon 76, and in all England 80. Hence South Devon appears liable to about the average amount of fever, but to no more.

Besides simple fever, variable in duration and gravity of symptoms, the most usual form met with is the typhoid, particularly in the autumn and winter seasons: occasional cases of relapsing fever also occur, more rarely true typhus, especially in its simple inflammatory form.

The typhoid fever of this district, generally speaking, sets in slightly, and only day by day creeps into difficulty; there is apparently but little disturbance of the brain, and this is chiefly perceptible in a slight amount of excitement or restlessness.

In fact, it is only careful observation that detects there is a departure from the usual mental condition. This restlessness is frequently betrayed by a desire to change the room; in some cases patients have even left their homes, usually a most fatal proceeding; the eye for the most part is clear and observing, with a pearly lustre of the conjunctiva; the pulse small and quick; the skin moderately warm, and not indisposed to perspire; the occurrence of small elevated rose-coloured spots are almost always to be detected on the arms and breast.

Besides the attendant symptoms due to the anatomical feature of the disease—the morbid deposit in, and ulceration of, the glands of Peyer—these fevers are commonly accompanied by local congestions, if not of inflammations, in some one or other of the great organs of the body. In many of these the organic complication was seen to be superinduced as epidemic influence or personal peculiarity determined. This may fairly be assumed from its not being infrequently observed, that at certain seasons there is almost an indiscriminate tendency to affections of a particular organ; while at other times different organs become affected, as constitutional predisposition may direct. In this district it may be stated that cases of simple and uncomplicated fever do not very often occur, a statement which is particularly true amongst patients in the working class; for cases of simple and uncomplicated fever are proportionately much less frequent amongst them than in the more affluent ranks of life. This is doubtless owing to the former receiving the infection of fever under circumstances with which an exposure to the causes of local inflammation is associated.

The typhoid fevers of South Devon are, in addition to the affections of the mucous membranes of the stomach and bowels, most frequently complicated with disorder of the viscera of the chest, and more rarely of the brain. It very rarely occurs that in a well-marked case of typhoid fever the chest is not implicated, as evidenced by a short dry cough, with, on auscultation, râles of various kinds being heard. This affection of the chest is essentially febrile, and, as the fever subsides, passes away. As the fever advances, and if resolution do not take place, the

chest becomes more gravely disordered, and the brain more disturbed; but during the whole time there is evidence of much bowel disorder, attended by pain or uneasiness on pressure, with tendency to distension, and to frequent liquid motions; there is also an intolerance of all medicines or diet that may tend to induce these. This fever, being for the most part adynamic and commencing in a state of irritability, and rarely succeeded by any very marked symptoms of reaction, requires throughout a mild and stimulating treatment, with a careful avoidance of purgatives.

In the valley of the Clyst this form of fever is more frequent than in other parts of South Devon, and there it certainly requires a larger amount of stimulus. In this district the cases with a pearly conjunctiva and a lustrous expression of the eye have appeared to be proportionately more frequent.

Typhoid fever occurred with much virulence in the autumn of 1835 and 1837. In 1838, in April and May. In 1839 and 1840 it assumed a hæmorrhagic tendency, and in some cases, besides bloody and mænal discharges, blood was passed with the urine. In all these cases the oil of turpentine was of signal advantage applied externally, and occasionally administered internally. In 1843, in June, many fatal cases occurred. In 1849 it again prevailed. In 1851, in the spring, there were many fatal cases in the valley of the Clyst, and in 1853 in the farm districts of Broadclyst, and during the winter of 1856 and spring of 1857 in the district of St. Thomas.

TYPHUS FEVER is certainly not so commonly met with as the typhoid fever, nor is it so frequent as it used to be; comparatively speaking, it is now rare to see a case of this disease. Its occurrence appears to be quite independent of typhoid fever, and in its symptoms it offers sufficiently distinctive characters; in its rapid mode of ingress, in the early suffusion of the conjunctiva of the eye, the general "stupidity" of the mental faculties, the peculiar deafness, the aspect of mental oppression, and the sordid leaden complexion. The cases also generally present an eruption of a mulberry hue, or of a dark pink, diffused over various parts of the body, and disposed to pass into petechiæ

and vibices; for the most part the abdomen is retracted. In every respect it exhibits an opposite state to that of the typhoid fevers as seen throughout the district.

Formerly cases of typhus fever were not infrequent in Exeter. They usually required a tolerably free purging, and the exhibition of bark, acids, and sometimes stimulants. If a few ounces of blood were abstracted in the first ingress of the symptoms, it was always advantageous. Latterly the occurrence of this disease has been very rare. This is mainly to be attributed to the destruction of its *nidus*, by the pulling down nests of squalid houses, in which, under unfavourable circumstances, large numbers of people were congregated together. In 1830, before these improvements were commenced, a virulent form of this disease occurred, and many deaths took place in consequence; though cases may now be occasionally seen (there were a few in 1858) they do not commonly present the formidable character the disease formerly exhibited, and the issue is for the most part in recovery.

RELAPSING FEVER is more often met with than typhus, but is not so common as typhoid fever. Though nearly allied to the former, it presents many distinctive characters. Its ingress is usually sudden, characterized by muscular and articular pains, pain in the region of the liver and stomach, with tendency to frequent vomiting. After the fourth day, may be the sixth or seventh, a copious perspiration ensues, which, for the most part, is sour, as in rheumatism; and this perspiration, if the fever continue, may recur at intervals of four or five days. The eruption of this form of fever is different both from that of typhoid and typhus fevers. Though it have not the petechial character of typhus, it is more allied to it than to the rose-coloured rash of typhoid fever: mixed with it, which do not occur in either of the other fevers, are those peculiar "flea-bite" appearances—undoubtedly an eruption proper to this form of fever.

Relapsing fever appears to be always and essentially attended by pain and inflammation in the liver, and probably lesion of

this organ is its anatomical character. Some of the cases have presented the dark jaundice of a yellow fever, with its irritability of stomach and bilious vomiting, even to the "black vomit" characteristic of that disease. Such was particularly the case in July and August, 1847. Occasionally large alvine discharges of blood take place: these are often critical, and herald improvements; whilst in typhoid fever they are always to be dreaded. This is probably due to the absence in the former of the intestinal lesions characteristic of the latter. It is in this form of fever the cinchona bark (more particularly Huxham's Tincture) appears to be serviceable; while in typhoid, and sometimes in typhus fever, it is heating and injurious. May be the relapsing or periodical phenomena characteristic of this disease indicate it to be a disease, like ague, more amenable to febrifuge tonics.

A peculiar form of spotted fever was epidemic here in 1836. The eruption, though at first sight very similar to petechiæ, on closer examination presented many characters which marked it as distinct from them, as also from the rose-coloured military eruption which is so characteristic of gastric fever. The skin within twenty-four hours after the febrile attack became generally darkened in colour and spotted over, especially on the chest and arms, with dots of a brownish red, sometimes passing into purplish. These dots were larger than the rose eruption of typhoid fever, and, instead of having defined margins like these latter, passed off gradually into the deepened colour of the surrounding surface. It was probably a vesicular eruption, for not only did many of the spots eventually assume this character, but generally the sequence was a desquamation of the cuticle. The fever, which was of an adynamic character, usually set in with an overwhelming feeling of lassitude and depression; headache, but no very marked mental disability (excepting in three cases, which occurred in one family; in these, low murmuring delirium continued for nearly three days); countenance anxious; eyes suffused; pulse quick, small, and wiry; tongue moist, without any very marked coat, though generally whitish; in some cases florid towards the extreme tip, and

in subsequent stages, towards its centre and back part, of a moist brown ; slight cough ; bowels more relaxed than otherwise, and at all times very easily acted on by medicine ; no great degree of thirst ; the skin warm, though by no means burning. The eruption made its appearance on the second day after the fever, and on the fourth or fifth usually declined. In these cases bleeding and strong purgatives appeared to exercise a most untoward influence ; while saline medicines, combined with aromatics, were peculiarly useful. On following this latter plan of treatment but few cases proved fatal.

This was neither typhoid nor typhus fever ; probably a mild form of relapsing fever ; nevertheless, those cases which, under untoward circumstances, succumbed to the disease, did not go through the more protracted forms of relapsing fever. It was a fever of short duration, rapidly fatal, or early resolving itself into health ; and, looking at the numbers attacked, recovery generally marked its course.

In November, 1847, and in the three following months, occasional cases of fever occurred, the prominent feature of which was a continued and exhausting sweating ; perspiration oozed out at every pore ; nothing appeared to control this tendency. The patients, as it were, melted away, and succumbed rapidly.

Besides these specific fevers, simple fever occasionally occurs, and, if uncomplicated with local inflammations, is rarely of long duration or fatal in its tendencies : for the most part, however, it is associated with inflammatory action in the viscera of the larger cavities ; the lungs are the chief and most frequent seat of this febrile inflammation, then the viscera of the abdomen, and then the brain.

The pectoral complications are, for the most part, forms of pneumonia ; and local hepatizations are often the result. Occasionally tubercle also is deposited. It has been affirmed, even in those predisposed to it, that fever does not cause nor originate tubercular deposit. In more than one instance, however, the symptoms of a fatal consumption, of which previously there had been no evidence, have manifested themselves and become fully developed after a fever.

Of the abdominal viscera, the liver and the stomach are the more frequent seats of inflammatory affection, and then, with tenderness of pressure, there is often a constant and most distressing sickness. When this is the case the tongue is sufficiently indicative of gastric irritation, its tip and edges being usually red and glossy, as if raw; while its surface, generally whitened, presents a spotted appearance from the raised state of the papillæ. The bowels are easily acted on, and, if once set in motion, difficult to control; the pulse is small and quick; the skin early becomes dry and harsh; and the thirst is excessive. On fevers thus complicated running a bad course, the patient may be much distressed by the mouth becoming aphthous, ulcerated, and covered with sordes. These inconveniences supervene more especially when children are the subjects of this kind of fever, and in them they present indications of much danger. In adults, however, these local aggravations are not so dangerous as troublesome; being usually relieved by treatment, and disappearing as the general symptoms decline. This form of fever prevails for the most part in hot summers and towards the autumn. It but rarely occurs in the winter and spring. Its tendency is to be protracted.

Complications with brain disorder are much less frequent than with disorders of the organs of the pectoral or abdominal cavities. In stating this the early stages of fever are referred to, and not any symptomatic disorder which may supervene towards the fatal close. When the brain is primarily affected, it is generally by congestion, perhaps effusion, accompanied by low muttering delirium, with coherence when roused; active and violent delirium is comparatively rare. This form seldom assumes an epidemic character, but occurs more usually in a few cases only, and simultaneously with those which may be characterized by other complications. When cerebral affection occurs, it may, for the most part, be observed that not only is it complicated with lesion of other organs, but that most usually the presence of these lesions had been previously manifested.

More rarely simple fever is complicated with spinal inflam-

mation. In July, 1843, a marked case of this kind occurred. A lad, aged 16, having chilled himself whilst bathing, fever set in with pain in the back; for fourteen days there was the frequent presence of trismus and opisthotonos. Sedative treatment always gave relief, and he eventually recovered; during the whole of this illness the head was free from difficulty. In September of the same year, in a stout man fever set in, with pain of the spinal column and loss of voluntary power. The pulse was small and rapid, and there were almost immediately petechiæ and vibices. The head also became affected. In this case, on touching any part of the surface, a quiver of the general surface and of the face took place; the same on passing urine, &c.—an exemplification of reflex motions developing themselves on the cessation of voluntary power. This disease ran a rapid course, and was early fatal, apparently from cerebral congestion.

During the last thirty years it has occurred three several times that the external mucous surfaces in children, during a scarcely appreciable attack of fever, have shown a great liability to take on an inflammation of a bad character, attended by copious mucopuriform discharges. In 1834 this was peculiarly the case with the female organs of generation; so much so, that if seen without a knowledge of the presence of fever and its epidemic character, suspicion might have been raised that disease had been impurely communicated.

In October, 1841, a low fever, accompanied with diarrhœa, prevailed amongst children, when the throat (from which in some cases false membranes were thrown off), as well as the conjunctiva, became inflamed; the eyelids, generally swollen, with difficulty permitted the state of the ball to be observed; soon the secretion became copious, and so tenacious as almost to preclude the possibility of the eye being opened. The acrid discharge, thus pent up, increased the malignancy of the local disease, and, in the event of life being spared, the little sufferer recovered with the eye materially injured, if not entirely destroyed.

Before concluding this hasty sketch of the fevers of this

district, a few words may be added on the treatment which fever has required at different periods. It further illustrates the changeableness of its epidemic character. Preceding, and about the year 1826, fever often required prompt antiphlogistic management. On its first onset blood-letting and smart purgatives were imperatively called for. Of late years such a course of treatment would have been followed by consequences the most disastrous; a fever so treated inevitably passed into a state of low collapse, from which no efforts could recall the system. Then a period occurred in which the free use of evacuants was almost entirely precluded; the only treatment admissible being slight purgatives, with mild saline medicine, to which, on occasion, might be added some gentle diffusible stimulants, as small doses of ammonia, with a little aromatic confection, valerian, &c. Latterly, and especially in the fevers of the winter of 1861 and this present year, the free and continued use of stimulants has been imperatively required. The fevers which occurred before and during 1826 were for the most part of an inflammatory character, while those prevailing latterly have been adynamic.

ERYSIPELAS.—This disease, so important as regards itself, and also in its relation to other diseases, has been epidemic on several occasions. In May of 1826, and during the succeeding summer, it assumed the phlegmonous form, having, in some cases, an idiopathic, in others a traumatic, origin. The premonitory symptoms were very severe, and indicative of the formidable disease to be developed. The subcutaneous areolar tissue early became affected, and the seat of suppuration and sloughing. This latter took place in some cases to such an extent that the muscles of a whole limb would be so exposed, as if carefully dissected. When this state of things occurred, recovery never took place, but amid delirium, sometimes very noisy and violent, the patients, after a few days, succumbed to the disease. The most efficacious treatment was the smearing the limb with mercurial ointment, and keeping up the strength with quinine and wine. Where

the integuments had become "quaggy," free incisions were immediately resorted to.

In September, 1842, and the early part of 1843, erysipelas of the face and scalp was very prevalent, as also in October and November, 1844, in November, 1845, and again in 1847. Though the symptoms in these epidemics were severe, fatal results rarely occurred. The sesquicarbonate of ammonia proved a valuable remedy, and apparently exercised a specific effect in lessening the intensity of the disease, while the only local treatment necessary was the covering the inflamed surface with arrowroot or wheaten flour. In this form of erysipelas the inflammation was essentially vesicular, and never phlegmonous.

METRIA.—Puerperal fever, nearly allied to, if not a form of, erysipelas, is not a constantly prevailing disease, but now and then occurs epidemically, and in association with cases of erysipelas. This was the history of things in 1826, in 1830, in 1838, and again in 1841. On these several occasions a few cases only occurred, and they were confined to limited districts. Such was the case in the city of Exeter. In August, September, and October, 1843, cases were much more numerous, and spread over a larger space throughout the district. The erysipelatous origin of some of these cases was very marked, as also the occurrence of erysipelas from contact with them. The attacks appeared always to commence in the structure of the womb, or with pain in the ovaries. The puerperal peritonitis, though early becoming an important feature in these cases, was the sequel to these antecedent inflammations. The treatment most useful was the free exhibition of mercury and opium, and the external application of the oil of turpentine. In October, 1844, puerperal fever was again epidemic.

The connexion between erysipelas and puerperal fever was strikingly shown by some interesting cases that occurred in November, 1841. A female died in childbirth; at the *post-mortem* examination the medical attendant pricked himself, and became the subject of a very alarming attack of erysipelas. After he had quite recovered, had been abroad, and apparently

was free from any communicable poison of the disease, a lady he attended in her confinement contracted a scarlatinous puerperal fever, and died.

FURUNCULUS.—In 1843, and for some years subsequently, boils prevailed. They appeared always to occur in those where there was a low condition of the system; in some cases they were associated with a saccharine urine, or a saccharine diabetes supervened on an attack. Generous diet and restorative medicines were indicated, and of use. To the local affection nothing appeared so useful or soothing as the non-evaporating water dressing. Bread poultices were generally injurious, from promoting a crop of small pustules in the neighbourhood of the boil, and some of which often terminated in furuncular abscesses. It generally appeared the most judicious course to promote the free maturation of the boil, and then to permit it to break and discharge itself spontaneously. The early opening them by incisions appeared to interfere with, and retard, the separation of the slough.

INFLUENZA.—This remarkable disease has prevailed here epidemically several times:—in the the year 1831 to a considerable extent; in 1833 and 1834 many cases were met with; but in 1837 its occurrence was more especially marked by the numbers attacked, and the severity of its symptoms. This epidemic appeared to travel from east to west. It commenced in the second week of January, and continued during the following six weeks. In the first ten days occasional cases only occurred; but on the 18th, 19th, 20th, and 21st of this month, it was generally prevalent. The more usual symptoms were, *firstly*, oppressive pains of the head, especially over the region of the frontal sinus; diffused muscular pains of the shoulders, loins, and legs; constant sneezing, early followed by a very copious flow of a thin acrid discharge, chiefly from the membrane of the nose. (The membrane of the eyes was not so greatly affected as in the influenzas of 1831 and 1834.) *Secondly*, these symptoms were quickly followed by an over-

whelming feeling of lassitude and prostration of strength, with, in many cases, a loss of all muscular power, together with great anxiety of the preeordia, and agonizing fears of impending death; a sensation of painful rawness of the fauces and trachea, a voice hoarse and hollow; frequent short cough, for the most part dry; stricture and acute lancinating pains of the chest; by the stethoscope there were heard râles, sonorous and sibilous, and almost always in some portion or other of the thorax, generally the lower, well-marked crepitation; tongue coated with a copious white mucus, excepting at the top and edges, where the papillæ were inflamed and elevated; bowels not confined, and easily acted on by aperients, in fact, there was rather a tendency to diarrhœa; appetite gone; occasional thirst; pulse, small and quick, but soft; paroxysm generally severe during the night. At this stage of the disease the existence of a peculiar and very characteristic odour exhaled from the lungs was observable; it had somewhat of a sour musty smell. *Thirdly*, about the fifth or sixth day a mucous discharge from the nose came on, together with a mucopurulent expectoration on coughing. The various symptoms now gradually declined, leaving the patients in a state of great general weakness, together with a peculiar aching feel and loss of power in the muscles of the leg. Such may be considered as a hasty sketch of the nature of the disease; it spared neither age, sex, occupation, nor condition of life; all appeared liable, without any discrimination, to its attack, though it was certainly both more severe and fatal in its consequences to children and old persons, especially if these latter were affected with pulmonary disease generally, or, in fact, chronic disease of any kind. Those children appeared to suffer the most severely who had laboured under whooping-cough, or the eruptive infantile fevers which had prevailed to a great extent during the preceding November and December. Relapses were not unusual; the symptoms, however, were modified, and lost much of their specific character, though these second accessions of disease were sometimes very severe. Nor were persons who had suffered from the epidemic in previous years any way exempted; on the contrary, they

appeared more susceptible of its influence. After an attack had subsided, convalescence, in those who were strong and healthy, was commonly quickly established; while in others, symptoms of general lassitude lasted for weeks; and even, in some cases, for months its effects were not recovered from. Phthisis, in those predisposed to it, seemed in many cases to follow the attack: in others it appeared to leave something like a chronic inflammation of the stomach; certainly many became dyspeptic, and found that various articles of diet which had been previously innocuous now produced such irritation as to preclude their further employment. In two cases stricture of the œsophagus followed the attack.

Much has been said with regard to the contagiousness of this disease; and though many facts were observed which bear strongly in favour of such a view, yet, from the general prevalence of the epidemic, any such conclusion cannot be assumed.

With regard to its prevalence, and the consequent mortality, some notion may be entertained from the following facts. The number of persons admitted to the Exeter Dispensary in the months of January and February of 1836 was 236, while the number during the same months of 1837 was 339; thus showing an increase of admissions during the prevalence of this epidemic of 103 patients. Of the whole number, 223 were admitted for influenza, or attacked during the time they were patients.

The registers of the two large burial-grounds of Exeter in January and February, 1836, exhibit the number buried as 125; while in the corresponding months of 1837 they amounted to 227,—an increase of upwards of 100 deaths.

The mode of treatment found most applicable was the exhibition of the milder diaphoretics and carminatives with diluent diet. Depleting and severe purging, excepting in very rare cases, were quite inapplicable.

The influenza of 1847 was preceded by many cases of fever characterized by remarkable collapse. In December the epidemic became general; those attacked complained of rawness of the throat and chest; sneezing was frequent, with running at the nose and weakness of the eyes; the cough was peculiar, being

hollow, sudden, and extending over the chest; the larynx was sensitive, and disposed to be inflamed. In some there were faintings and great depression. The stomach was weak, with feelings of sinking and "shaking;" want of appetite; tendency to diarrhœa. All complained of pain of brow and of the limbs, and in some the joints showed a disposition to swell; the urine, for the most part, was increased and free from deposits; pulse quick, small, and weak; the general symptoms were those of debility: in some, after a time, the expectoration became sanious and bloody, and the subsequent recoveries were usually slow, apparently from debility of stomach. In old people the pulse was rather full, soft, weak, and very compressible; the chest much oppressed, the breathing rapid, the skin moist and soft, with much general prostration of strength. Many of these cases resolved themselves into the ordinary symptoms of a *peripneumonia notha*.

The epidemic influenza of 1775 appears to have been remarkably similar to the above in all its relations. A very graphic description* of it has been left by Dr. Glass, a physician formerly practising in Exeter:—"In the city of Exeter, and the country about it, colds and coughs were not more frequent than usual during the latter part of the last autumn. But from the 8th of November the number of people who were continually coughing increased so fast, that it was soon evident the epidemical colds, which began in London more than a week before, had reached us. This disease appeared to be at its height here from the 18th to the 24th of the same month, and attacked very few after the 4th of December; but by this time almost every one had felt more or less of its effects.

"On the 11th or 12th of November it made its appearance in the Devon and Exeter Hospital, and within a week seized 173 persons, being all the servants and patients then in the house, except two children; 162 of them were coughing together. Is it not remarkable that such a number of hospital patients, afflicted with so various and different kinds of dis-

* "Medical Observations and Inquiries by a Society of Physicians in London," vol. vi., p. 364.

tempers, and under the operations of the most efficacious medicines of the most opposite qualities, should have been all affected, almost at the same time, and in the same manner, by the cause of these epidemical coughs ?

“Two or three days after the hospital had been attacked, the city workhouse was visited by them ; of near 200 poor people who are in this house, but few escaped ; all the others were complaining at the same time.

“From Exeter the disease traversed towards Cornwall ; about the 13th of November it arrived at Oakhampton and Ashburton, and about the 15th at Plymouth. I have no certain intelligence when or where it passed from Devonshire into Cornwall ; but by the 20th it had reached Truro, and, before the end of the first week in December, had spread to all parts of that county.

“The constitution, productive of this epidemie, very seldom, I believe, continued to exert its influence with much force in any place more than three weeks or a month ; so that, after this time, a few only were attacked by it : and it was generally observed that in the churches, for two Sundays following, nothing was to be heard but coughing ; and that on the third Sunday this disturbance was much less. I cannot find that there is any part of these two counties but what was visited by it.

“Its appearance in this city was the same as in London, except only that it was here much more favourable, and attended with some symptoms besides those you (Dr. Fothergill) have mentioned in your sketch ; for many of our patients, especially as had a considerable degree of fever, complained of great lowness of spirits and sudden weakness ; several of them to a perfect inappetency both to meat and drink (most of these had severe coughs without much fever), and some of them a soreness throughout the windpipe and œsophagus, with a great pain in swallowing even liquids ; others of a violent pain in their ears ; a few had sloughs of the malignant kind on their tonsils : swelling of these, and of the submaxillary glands were not unfrequent, but occurred oftener in some towns than others. One of my patients had a large parotid, which suppurated slowly, and broke at the end of three weeks ! Eruptions on the

lips, towards the crisis, were a common and very salutary symptom. Many felt no feverish heat, but almost all, if not all, had more or less of a cough."

As regards treatment, Dr. Glass says that those who had the coughs with fever did best by taking no notice of their ailments. Those who were feverish required the warmth of bed, and the exhibition of demulcents and diluting drinks. A stimulating treatment was injurious. "In a certain town many persons, to whom, as soon as they applied for assistance, wine whey with spirits of hartshorn was freely given to force out a sweat, and paregoric elixir to quiet their cough, became delirious." Bleeding was generally injurious, and only useful where urgent inflammatory symptoms ushered in the disease.

"Peripneumonic complaints, the most alarming symptom of all, were gradually carried off by a few and easy expectorations of digested matter. Such remedies were therefore administered, as have been found, by experience, to promote the digestion of thick viscid humours collected and retained in the lungs, and to facilitate their discharge.

"This disease proved fatal to exceedingly few in this city and country, and those who died of it were ancient persons or pulmonies. Such as these have been the principal sufferers in every epidemical catarrhus constitution of which I have read any description. Children, both in Devonshire and Cornwall, were less subject to the distemper than adults; their complaints, when they had taken it, were slighter, and they sooner got well. Almost all of them had watery eyes and a running nose."

In the epidemic of 1782,* Dr. Parr states that it first appeared in Devon, May 23; was prevalent in June; disappeared in July—lasting in the county about seven weeks.

DYSENTERY may be said to be a disease not proper to this district. Sporadic cases occasionally occur, but they are ac-

* For an account of this and other epidemical attacks of influenza, *vide* Registrar-General's Tenth Annual Report, p. xxvii. The influenza of 1782 is fully described in the "Medical Communications," vol. i. Dr. Ruston, of Exeter, contributed the history of its symptoms in Devonshire.

cidental, and usually due to a loaded state of the bowels with a congested liver, and are unaccompanied by any specific fever: these cases are, for the most part, promptly relieved by free purging. In August and September, 1825, a period characterized by an unusually high temperature, febrile dysentery occurred in an epidemic form. Though not very widely prevailing, the cases were severe, and some of them proved fatal. The attack was ushered in by febrile symptoms, and the distress and tormina of the bowels were severe. The treatment which appeared to give the most satisfactory relief was the exhibition of repeated doses of blue pill and opium, and ipecacuanha, with an aperient mixture of castor oil and henbane. In 1831 there were also a few cases. Bad as some of these cases were, it is more than probable in this district we have never seen the dysentery that occurs in the tropical regions; certainly the accounts of the dysentery, as experienced by our troops on foreign service, is different from anything we are accustomed to see; nor is chronic dysentery a usual sequel of the epidemics which have occurred here. The chronic dysenteries presented to our observation are, for the most part, in those persons who have resided in the East. This climate agrees well with, and is healing in, these cases. Sustained doses of the sulphate of copper with ipecacuanha and opium, or henbane, and an occasional few grains of blue pill, generally effect a cure: unless in very bad cases, permanent recovery may be looked for.

DIARRHŒA usually prevails in hot summers and during the autumn, and is as generally rare when these seasons have a temperature below the average. This was markedly the case during the summers of 1860 and 1861. These seasons were neither warm nor abundant in fruit—evidently both exciting causes of the disease. Amongst children, however, it is at all seasons a not unfrequent affection. Its character is usually either the bilious or mucous, and requires the ordinary treatment recommended in these forms. It is sometimes very obstinate, and appears determinately to resist the more common

remedies. During the autumnal months it occasionally passes into English cholera. In 1828 this form of diarrhœa prevailed to a great extent, in fact, was a very wide-spreading and fatal epidemic; it commenced by a purging, immediately succeeded by vomiting; the evacuations were forcibly expelled, and without any exertion on the part of the patient. During this first period of the epidemic severe griping pains were felt; then general depression, weak pulse, and all the symptoms of collapse, cramps in the legs, sunken countenance, thirst, together with a continuance of the vomiting and alvine discharges—these to such an extent as to be really most remarkable. If these symptoms were not capable of being controlled, about the third or fourth day the patients most usually succumbed to the disease. The treatment which appeared to be followed by the most satisfactory results was, in some cases, the exhibition of blue pill and opium, with effervescing saline draughts; in others, lime-water and milk.

Diarrhœa alba is occasionally met with; though often very obstinate and persistent, it is apparently rarely or never fatal. In cases of this variety of diarrhœa, mercury in any form proves disadvantageous, and rather tends to aggravate the characteristic symptom. The most useful, and always a safe, remedy is lime-water and milk. This, with a nutritious and unstimulating diet, generally, after a time, effects a cure.

ASIATIC CHOLERA.—The great visitation of Asiatic cholera took place in 1832. The first case that occurred in Exeter was on the 19th of July. It was at that time prevailing both in London and Plymouth; and it is not a little remarkable that this first case was in the person of a man who had in the previous twenty-four hours travelled from London; while the second case, which occurred on the following day (the 20th), in a totally different part of the town, was in the person of a female who had come three days previously from Plymouth. On the third day the disease showed itself at very widely different points, and, before four days were completed, it was a general epidemic.

At the first blush of this statement, it would appear that a strong inference might be drawn from it in favour of the contagiousness of this disease. The occurrence of these cases is, however, open to different explanations. Both these persons may have been affected with the peculiar poison of cholera previously to setting out upon their journeys, and on coming into an atmosphere in which the epidemic poison was commencing to exert its influence, may have been liable to the full development of its power earlier than those living quietly within the district; or they may even not have been infected previously, yet may have been rendered more susceptible by coming into the midst of such an atmosphere while under the debilitating influence of travelling. As an argument against its contagiousness, it may be mentioned that several neighbouring towns, with which the communication was most frequent and unrestricted, escaped, comparatively speaking, from its attacks. We may specify Topsham, four miles and a half from Exeter, Crediton, eight miles, and Dawlish, twelve. In these towns one or two cases only occurred.

The history of its occurrence here was much the same as described elsewhere. The symptoms differed in no respect from what had been observed in other localities. All this, together with an account of the mode of treatment, has been very fully described elsewhere.* It continued very fatal for the first three weeks, and then gradually subsided: as an epidemic it may be said to have ceased by the 1st of September. During its continuance more than four hundred of the inhabitants fell victims to its ravages.

In August of the following year (1833) cases of diarrhœa were somewhat frequent. In September these assumed a more urgent form, and were accompanied by much cerebral disturbance. Towards the latter end of this month and in October cases of Asiatic cholera occurred, but not to the same extent as in 1832. As a remarkable fact, it may be mentioned that a great number of lunatics were attacked during this second slighter epidemic, a class of persons who had not particularly

* "History of the Cholera in Exeter, 1832."

suffered in the previously more severe visitation. In this lesser visitation, which lasted from the 7th of August to the 6th of October, twenty deaths took place.

In 1834, the disease again recurred, commencing on the 16th of September and lasting till the 15th of November; there were during this short period forty-seven deaths. In 1846, two isolated sporadic cases occurred.

In 1832, and for a few years subsequently—that is, during the periods of these epidemics—the sanitary condition of Exeter was bad in the extreme; old and ill-constructed houses crowded together; the city, generally, but scantily supplied with water, and badly drained, &c., it was in the parts of the city where inconveniences from these deficiencies mainly existed the larger mortality took place. Much of this was, however, promptly and effectually remedied, so that when, in 1849, the cholera again became a general epidemic, the city was in a very different position, and the results, as regards the occurrence of this disease in this city, were most striking and satisfactory. While the contiguous large towns, in company with which, in 1832, Exeter had suffered, were in 1849 again afflicted by an equally large amount of mortality, Exeter escaped with only forty-three deaths, including cholera and diarrhœa.*

REMITTENT FEVER, as an idiopathic disease, rarely occurs; if a case be met with, it will be found generally associated with some local complications, as subacute inflammation of the liver, stomach, or intestines. These cases, and they generally do well, are often terminated by a spontaneous diarrhœa. Cases of infantile remittent are not so rarely met with, still it is not a prominent disease of the district.

INTERMITTENT FEVER is of very rare occurrence; occasionally a case of quotidian or tertian ague may present itself; but, generally speaking, it is not a form of disease proper to this district. In 1826 and 1827, a few cases occurred, but these

* *Vide* “Sanitary Measures and their Results,” being a sequel to the “History of the Cholera in Exeter, 1832.”

were chiefly amongst the navigators employed on the Exeter canal, which was then in the course of extension. These men were exposed, by the nature of the work upon which they were engaged, to an influence peculiarly fitted for its development. The district generally, however, presents no conditions likely to originate fevers of this character. Formerly, the low grounds of the Bovey-Heathfield were a source of this disease, but drainage has rectified this, and cases are not now very frequent there.

Two cases of intermittent fever, in some respects remarkable, may be here referred to. In the one the exciting cause was fright, and a true tertian followed; it occurred in a young girl aged nine. In the other, a lady, generally resident in Lincolnshire, after staying a month in Exeter, visited in the immediate neighbourhood for ten days, and then, on returning to Exeter, was attacked by a quotidian in its severest form. She had never, during her residence in Lincolnshire, suffered from any form of intermittent disease.

RHEUMATISM.—A general impression prevails that rheumatism is peculiarly frequent in Devonshire. This does not, however, appear to be the case. So far as statistical returns may be adduced as evidence,* South Devon is relatively less obnoxious to the various forms of this disease than London or the north of England. It is not improbable that formerly a great many more cases occurred than are now met with. This was due to the lead, which being, as it doubtless is, a fruitful source of rheumatism and its allied diseases, was formerly largely imbibed in the cider, the native drink of the county. This source of the disease, save in the various trades connected with the employment of lead, does not now exist.

The cases which do occur consist chiefly of subacute rheumatism, rheumatic gout, and more especially of chronic rheumatism. Acute rheumatism is only occasionally met with. The various forms of this disorder occur during every period of the year, but the months of March, April, May, and June constitute the season in which they chiefly prevail; during the autumn they

* *British and Foreign Medical Review*, vol. vi. p. 14.

are evidently upon the decrease. In March and April of 1833, there were a number of cases of rheumatic fever: the former month was unusually cold and dry, with rather a low range of the barometer; the latter was cold and wet. As a general rule, the treatment in acute rheumatism attended with the most speedy and certain relief is the sedative combined with the cinchona bark. A combination of opium, quinine, colchicum, and ipecacuanha has proved not only serviceable towards inducing an early resolution, but has appeared to avert those many ill consequences so often attending these attacks, more especially metastasis to, and permanent affections of the heart. Blood-letting, whether by venesection or by leeches, has failed to give relief, and weakened the patient. Nor has the free use of the much-lauded lemon-juice proved curative. Occasionally nitre and the fixed alkalies are serviceable, but whatever may be the mode of treatment adopted, the occasional use of mercurial purges is certainly indicated and beneficially resorted to.

In that form of chronic rheumatism in which the synovial joints are chiefly affected, being swollen and distorted, the iodide of potash, with the compound tincture of bark, or the cod-liver oil, are most useful; as also a liniment of castor oil and oil of turpentine. The use of the cod-liver oil in these cases of chronic rheumatism has been of very ancient date in the West of England. I have oral testimony to its popular use for nearly a century. The oil then selected by the public was the dark-coloured and the strong-flavoured.

In the chronic rheumatism that chiefly affects the fibrous tissue, besides warm clothing and a careful diet, the compound tincture of guaiacum, Dover's powder, and hydriodate of potash, generally prove useful. If the urine be deficient in urea, which it generally is, colchicum is useful in increasing its discharge. In sciatica a most useful and satisfactory application is packing the limb, from the toe upwards, in a warm opiate or poppy fomentation. This alone often effects a cure.

Sciatica is not an unfrequent complication, and often proves a very disastrous affection, inducing, amid much pain and suffering, a permanent lameness, with wasting of the limb. In

February, 1844, a remarkable case of the acute form of this affection occurred. A lady, aged 30, became the subject of an attack; after a few days of excruciating suffering in the course of the sciatic nerve and about the knee-joint, the pain suddenly ceased, and a metastasis to the chest took place. Violent spasms came on in the breathing, and, gasping anxiously for breath, she sank. This was probably a case of embolism, with fibrous deposit in the large arteries.

In July, 1853, a very protracted and distressing case occurred, in which this disposition to form fibrous deposits was rendered very evident. A young clergyman was the subject of a very painful attack of acute rheumatism, which, after showing many tendencies to metastasis, appeared finally to affect the blood principally, and embolism so obviously took place that, before he finally succumbed to the disease, a series of attacks of gangrene of the limbs ensued.

It is worthy of mention, that frequently acute attacks of rheumatism are ushered in by an eruption of urticaria, and sometimes this becomes a co-existing complication, or may even continue afterwards as a chronic affection, when all the ordinary symptoms of rheumatism have subsided. Colchicum in combination with bark is the most certain and efficacious remedy towards its relief.

LEPROSY.—Numerous cases of this disease are met with throughout the district; commencing, for the most part, in early life, in small circular spots, it afterwards creeps over the surface in irregular patches of dirty white branny scales, sometimes to such an extent that the poor leper is a sad object to look upon.

Though somewhat amenable to treatment, it is a very obstinate disease, and, when once established, a permanent cure is rarely effected. One, aged 50, who has been now afflicted with this disease for forty years, thinks the compound decoction of sarsaparilla does her the most good. Another was much benefited at times by light acids. A careful diet, and the scrupulously abstaining from pork or other gross food, are, however, the main objects to be looked to.

Occasional cases of elephantiasis are also met with. The one particularly referred to, and figured, by Willan, was a native of this county, and eventually died in the Devon and Exeter Hospital. In this case the face was chiefly affected; usually it is the feet and legs, or rather one leg and foot, for it rarely attacks both extremities. The cases that have occurred have been invariably in large, loose-made people, with a tendency to obesity, without absolutely being obese.

It appears from the records of this county, that there were in ancient times, in this neighbourhood, several leper-houses; and Exeter, to this day, preserves the one founded there, still devoting it to cases of this nature. Grounds have been shown, in another place,* to conclude that these were not separating, or "pest" houses, but merely charitable foundations for a lamentable form of disease; the existence of these houses in South Devon proves, however, that in ancient times this district was not exempt from this dreaded scourge of the middle ages.

HYDROPHOBIA.—Two cases have come under my observation, the one traumatic, the other idiopathic. The former occurred in a young lad, who, having been bit by a dog assumed to be rabid, was retained for upwards of a month in the Devon and Exeter Hospital, without in any way showing the least departure from health. He was discharged, and within twenty-four hours the disease developed itself, and he soon succumbed to the violence of the spasm. On the examination of the body nothing very definite was found, save that the stomach was distinctly inflamed in patches.

The other case—which, as regards symptoms, was fully marked—occurred in a painter. He had been ailing with feverish symptoms for three or four weeks, when tetanic spasms, with a distinct hydrophobia, supervened; the general expression of countenance was that of terror—the eye staring, pupil contracted, pulse small and rapid. The tongue, after repeated

* "On the Leprosy of the Middle Ages."

solicitings, was, by a rapid motion, protruded with much difficulty. The mere mention of drinks threw him into instant convulsions. The free exhibition of opiate enemata, during the course of three days, so relieved this patient, that the spasm had entirely subsided.

NECUSIA.—Cases of infection from wounds in dissection have at times occurred. They, however, scarcely come within the scope of this chapter; one, however, is so remarkable, as showing the occasional intensity of an animal poison, that it may be referred to. Jan. 4, 1844, a surgeon, examining the body of a person who had died of a muco-puriform bronchitis, but in whom pus had infiltrated itself in different tissues, became, through a slight abrasion previously existing in his finger, inoculated with the poison inherent in this body. Three days afterwards he felt unwell, became restless and sleepless, and within the week fever set in, with tumefaction of the arm and left breast. After a persistence in this state of things for three weeks, a large abscess formed in the left breast; this was followed by some relapses, and a slow recovery. A medical student that squeezed the sponge used in the examination of the above body, and the nurse that washed the cloths, had both poisoned swellings of the arm.

SCURVY.—Cases of scurvy are but rarely seen in this district, but in the early part of 1847 numerous cases occurred both in Exeter and the neighbourhood.* In the first stage, besides a general feeling of debility, and lassitude, and nervousness, there was a sensation of faintness, with some little oppression of the breathing, accompanied by a chilliness, slight superficial pains of the limbs, with uneasiness across the loins; countenance sallow, lips pale, and the gums *pale* and *contracted*; the tongue clean, moist, and pale; the appetite good; bowels regular; urine scanty, opaque, and feebly acid; pulse small, soft, and not quicker than natural.

* For a more detailed account of this epidemic, *vide* paper in *Medical Gazette*, vol. ii. 1847, pp. 945 and 990.

In the second stage the general feeling of debility was more confirmed; the nervousness was of a subdued character, and partook of despondency; the respiration became slightly accelerated, heaving, and somewhat oppressed, and attacks of faintness occasionally supervened; the countenance was opaque and dusky, with a dejected expression; the general pains of the body were increased and deeper-seated, and the pains of the loins particularly dwelt upon; the gums were now livid, swollen, spongy-looking, but hard, with a tendency to bleed; the breath had a peculiar fœtid smell, not altogether unlike the fœtor of a mercurial taint; petechial spots appeared on the legs and arms, and the surface generally was easily bruised; the pulse was small, feeble, and slightly accelerated; a disposition to feverish attacks was evinced, but these, if judiciously attended to, were easily controlled. In some cases the joints not only felt stiff, but were really enlarged, and even painful nodes formed rapidly on the clavicle, sternum, and tibia.

In the third and last stage, at which but few arrived, the breathing was slow, sighing, and very oppressed; a sanious discharge (very different from the sputum of a pneumonia) was coughed from the lungs; the gums were swollen and painful; the breath very fœtid, and there was general evidence of the fluids of the body being disorganized, in the appearance of petechiæ, and tendency to bleeding from the gums and mucous surfaces of the vagina and rectum. Some hours previously to the close of life an inability to articulate the desired words, followed by an overwhelming stupor, induced the conclusion that serous effusion on the membranes of the brain had taken place.

The weather preceding this epidemic had been unusually severe, and the cold protracted, while during its continuance the weather was dry and cold, with winds from the eastward. Though a depressing season such as this may have had its influence, yet, considering all things, the appearance of scurvy was evidently due to a deficiency, in the food, of some of the elements necessary for adequate nutrition, for it was only amongst the very poor the cases occurred. It is probable the

deficiency was in those acid principles usually afforded by the potato. In consequence of the then failure of this crop, the poor had been almost entirely debarred its use. The cases occurred indiscriminately amongst people differently situated as regards residence and occupation, but under the one condition of the unwonted disuse of their usual diet of the potato. Moreover, in the Crediton union workhouse, where, in the otherwise usual dietary, in place of potatoes rice in adequate quantity had been substituted, numerous cases occurred.

In accordance with the indications derived from the origin and nature of this disease, the mode of treatment pursued was mainly the use of acids, and much benefit resulted therefrom. The use of potatoes, if they could be procured good, and other vegetables, was enjoined, together with oranges, cider, vinegar, pickles, &c.; in fact, such treatment as is usually recognised to be adapted for the counteraction and cure of scurvy.

Some modifications of the usual symptoms occurred. In one the integuments assumed the curious and remarkable affection which is termed "hide bound." A rheumatic pain commenced in one arm, followed by a general swelling, of so solid and firm a nature as to impede its free use; and difficulty was increased by the fingers becoming distorted, and incapable of being bent. The same phenomena then took place in the other arm, and this was followed by a stiffness about the muscles of the back and legs. As the disease progressed the nails were lined and roughened on their upper surface. This state of things continued many months, but was eventually cured by a liberal use of fresh lemon-juice.

A lad presented somewhat the same state of things in the calves of the legs, but here there were also petechiæ, and an albuminous urine.

PURPURA but rarely offers itself for observation, and then under forms so very different as to indicate the existence, under this title, of diseases of totally different natures. Save as regards the presence of the purpurul spots, there may be but little that is identical. Some cases required tonics and acids with a generous

dict, but for the most part they were relieved by a few mercurial purges and an antiphlogistic diet. Such was the case in 1842, when several cases occurred. There was but little fever, but much depression, and this was invariably relieved by evacuants, and increased by acids and stimulants. A case of febrile purpura, different from the above, was remarkable for the urgency of its symptoms and the rapidity of its course. A young lady, previously amenorrhœal, was suddenly taken with feelings of lassitude and faintness. Small, defined, isolated circular black spots developed themselves scantily over the person. The contrast between these spots and the purest white skin was remarkable; they were as ink spots on a snow-white alabaster; the pulse was rapid, small, and feeble; the breathing hurried, and she soon succumbed to the disorganization of the blood. Purpura urticans is not altogether very unfrequent in the advanced in years. Some of the worst cases have occurred in those where untoward circumstances have depressed the mind. The itching in these cases was at times most distressing, and scarcely to be allayed by opium, combined with aloetic purges, which appeared almost the only remedies capable of acting with anything like advantage. Sometimes turpentine or the balsam of copaiba was of use; but opium gave the more certain quiet, and the greatest support.

BROCHOCNELE every now and then presents itself, and generally amongst those residing on the slopes and in the low ground at the foot of the green sand hills. For the most part it occurs in females, and the amount of swelling is evidently influenced by the catamenial periods, and the conditions of life therewith connected. In these cases the tumour is somewhat soft, with at times indistinct indications of a fluctuation. In the male affected with bronchocele the tumour is invariably hard, and very difficult of cure. For the most part it occurs in the leuco-phlegmatic habit, which does not bear well the sustained use of iodine internally administered. The most suitable treatment has appeared to be light forms of steel, or a few grains of burnt sponge, with an external application of

iodine, and the occasional application of a few leeches, alternated with blisters. Upon the whole, though the medical treatment of these cases is not very satisfactory or conclusive, yet occasionally cures are effected.

ALCOHOLISM.—With the rest of the civilized world, this district is not free from evidences of the intemperate use of alcoholic drinks, still it is not a besetting sin of the south of Devon. Though unfrequent, the worst cases of dipsomania occur in females; in them, when confirmed, it is almost impossible to be cured, unless a control of long period be permitted; then, with the use of opium, it may perchance be overcome. In females, to themselves one of the most distressing symptoms has been tenderness of the soles of the feet, and cramps of the acutest kind in the calves of the legs and thighs. It is probable these symptoms take the place of gout in men—a disease which is rare in female dipsomaniacs. These symptoms are, though rarely, yet occasionally met with in men also. In some of these cases the insatiable thirst has been alleviated by the free use of a very weak mineral acid drink, made warm and stomachic with a little ginger. This drank *ad libitum* has in some cases given tone to the stomach and nervous system, so that recovery from the abject state of disease has been effected, but no good can be expected in these cases unless there be an entire abstinence from every kind of alcoholic drink or medicine. It appears as if the system were so surfeited with the deleterious qualities of the alcohol, that the least quantity sets the whole train of morbid feelings in action. Where there is a tendency to any form of paralysis this is very obvious. Cases have presented themselves in which a painful state of the limbs, with an entire deficiency of control over them, has lasted for weeks after a drinking bout. With an experience of such a consequence, yet will these people at times give way to the vice. One poor sufferer thus expressed himself:—"When the fit was on him, if spirits were within his view, though a chasm, with hell yawning at the bottom, intervened, he must try to obtain it."

PARASITICI.—Those diseases which are due to parasitic vegetable growth, the thrush and tinea, are often met with, but perhaps not more so than elsewhere. Some cases of tinea, or porrigo decalvans, have been remarkable in their history. One, in the person of a young lady, living inland, was always benefited by residence on the sea-coast. In this case the depilatory process denuded scalp and eyebrows. In a lad, aged fourteen, where for months there had been large patches of denuded scalp, a perfect cure was effected by the assiduous application of chloroform. To this remedy, in this and all other parasitic diseases, I would wish to call attention. A few years since it was mentioned to me that in one of the large museums of the kingdom the stuffed birds had been effectually preserved from the moth and insect by placing in the cases small saucers of chloroform. Acting upon this suggestion, I have used it in cases of parasitical diseases, both of animal and vegetable origin, and with very marked success. In *tinia favosa*, in scabies (in which disease, though relatively an expensive, it is a safe, clean, and efficacious remedy), and internally in tape-worm. In this last the cure was effectual, and without distress of any kind.

It is generally understood that the people of Devonshire are very obnoxious to tape-worm, and that this is due indirectly to the large amount of pork consumed as food—it being assumed that “measly” pork, that is, pork affected with the *cysticercus cellulosæ*, is capable of generating in the human frame the *tænia soleum*. There appears to be ground for this conclusion.* Doubtless cases of tape-worm are often presented to one’s observation. Beside the chloroform and the oil of turpentine, the koussu, the essential oil of the male fern, and the bark of the root of the pomegranate are occasionally used; this latter is often very efficacious. The following formula may be recommended:—*R Cort. radicis punice granati*, ʒij, *aquæ*, lb. ij., *macera per horas xxiv., decoque ad lb. j., adde syrupi zingiberis* ʒj. Two ounces of this to be taken every half hour until the worm is

* Küchenmeister fed criminals on measly pork, and the *tænia soleum* was found in them. — *Medical Gazette*, 29th October, 1860.

expelled. If the head become dizzy, which is not unfrequent after the fourth or fifth dose, it should be discontinued. It is quite neccessary that the above should be made of the bark of the root, and not of the rind of the fruit; this latter appears to be totally inert as a vermifuge. Present experience induces me, however, to prefer the chloroform to all of these latter remedies.

Two cases of Guinea worm have been presented to observation, but they were on each occasion imported from the coast of Africa. They were interesting, as permitting one to see the worm, and the curious process of cure by gradually unravelling, and thus extracting it.

Gout is esteemed to be not so frequent a disease in this district as it used to be, still it is, in many protean forms, met with. The cider-drinker is not free from it. In old time he was probably more liable to it than now, but this was mainly due to the admixture of lead. It is now rare to see a journeyman painter of advanced age without some signs of this disease, and more often with distorted joints and chalk stone deposits. Doubtless the absorption of lead into the system very greatly predisposes to this affection. In persons so situated, the more frequent complication or local determination is to the brain or nervous system. A painter whose joints showed indications of previous attacks of gout was brought into the Devon and Exeter Hospital incoherent and in a semi lethargy. In this state he remained for some days, when, on the appearance of an inflammatory gout, the brain symptoms immediately disappeared. In other persons the chest has appeared the most frequent organ complicated with gouty tendeneics. Many cases have presented themselves of severe bronehitie attacks promptly relieved by the appearance on a distant limb of an inflammatory gout. In this climate, those having any tendency to gout find the red wines and beer particularly injurious, quickly inducing some general disturbance of the system, as evidenced by perhaps giddiness, irregularity in the heart's action, &c., and those many premonitory signs so well known to the sufferers from this

disease. The threatened attack is then best arrested by alkalis and a brisk cathartic. A few glasses of an unbranded sherry are the most suitable stimulant for those so predisposed. Brandy for the most part is rather injurious than otherwise. The best prophylactic is the keeping the bowels moderately open, and for this purpose a combination of the gum guaiacum, nitre, sulphur, and rhubarb is most useful; this, with a wholesome temperance and plenty of out-door exercise, especially on horseback, will effect much. When a joint is very painfully affected, sometimes great and perhaps instantaneous relief is afforded by the application of collodion. This is a most safe and satisfactory remedy, provided there be no co-existing fever.

DROPSY is in this district more frequent than appears to be the case in many other places; it forms $3\frac{1}{2}$ per cent., or 1 in 28 of the whole diseases. But its occurrence is chiefly due to the existence of other diseases inducing those visceral congestions which produce it. Idiopathic dropsy is rare. How far this prevalence of a colliquative dropsy is due to the moisture of the climate is difficult to determine. It is, however, a common belief that dropsy is more frequent in places where the atmosphere is generally charged with moisture: the theory of which is, that a climate of this nature produces a preternatural fulness of the blood-vessels by retarding the flow of blood in the veins; hence (assuming such to be a predisposing state of the system) upon any defect arising in the compensating functions of the kidneys, or other excretories of the animal fluids, dropsy ensues. The cases of dropsy which constitute the greater proportion are anasarca, and occur for the most part in those whose constitutions are broken down by other diseases, or in old persons attacked by inflammatory disorders. In young females it is sometimes caused by the disturbed state of the constitution, consequent upon uterine derangements. Generally speaking, the number of cases is much the same at all periods of the year; to a certain extent, however, it may be that more occur in April and fewer in September.

In an able summary of the reports of diseases from several

towns, in the sixth volume of the *British and Foreign Medical Review*, it is remarked that the proportional occurrence of dropsy in any district furnishes a fair index of its morality—the prevalence of intoxication, and of spirit drinking especially, being indicated by the amount of dropsy. As far as this district is concerned, such an inference can by no means be drawn; for its inhabitants are not particularly addicted to intoxication, and certainly not to the indiscriminate and free use of ardent spirits. As a proof that dropsy owes its origin to some other source, it is here comparatively rare to find the nutmeg liver in connexion with it. The great amount of the dropsy of this district rather seems owing to the general deprivation so constant amongst the poor, and to the want of sufficient clothing and care on exposure after sickness.

In the strumous ascites of children, occasional cases of which occur, it is remarkable the benefit, even to permanent cure, that has been effected by the internal use of cod-liver oil, and the assiduous external use of the iodide of potash ointment.

SCIRRHUS occurs in about the usual average, and presents the ordinary features. How far this affection is eradicable by the aid of medicine or by the knife of the surgeon is generally esteemed doubtful. There can, however, be no doubt that general rest, an unstimulating diet, and the liberal use of opium will do much to retard its progress, and may even keep it in abeyance. The amount of opium taken with advantage in some of these cases has been eventually very large, its constipating effects being easily counteracted by an occasional alterative dose of aloes. In young persons cases often occur of defined swellings of the breast, which are soon dissipated by the external use of the iodide of lead. It must, however, be assumed that these cases are not true scirrhus, but only local inflammations of the lactiferous tubes.

Some years ago a case of colloid cancer, somewhat peculiar in its form, presented itself to my observation. As far as permanent cure was concerned, it proved entirely refractory; all that one could do was to quiet symptoms as they arose. The case

originated in a blow upon the right mamma. The disease first showed itself by slight swelling, followed by ordinary superficial abscess, about the size of a nut; afterwards small nodules arose, from which exuded a thin ichorous fluid. On these surfaces healing, the characteristic cicatrices were formed. This process went on from time to time for many years, until the whole structure of the breast appeared to be annihilated; then the disease extended itself over a considerable portion of the chest and shoulder. Finally, much pain was felt in the arm, which became greatly swollen from œdema, presenting the appearances usual on an aggravated and protracted scirrhus breast. The patient ultimately sank.

A few cases only of MELANOSIS have occurred. In one case the deposit was extensively distributed, especially in the areolar tissue of the lungs. In another case, where there are evidences of a diseased heart, it has now existed for years in a few limited spots upon the surface.

* LUPUS is not an infrequent disease; it but rarely occurs the County Hospital is without a case. It must not be considered entirely an incurable disease. A late practitioner of Exeter assured me he had seen signal utility in the administration of the ammoniated copper. Perhaps more satisfactory results have attended the destruction by escharotics, such as the ehloride of zinc, or the potassa fusa, of the diseased structure, especially that portion of the surface showing the incipient tubercle.

NOMA, or CANCRUM ORIS, is but of very rare occurrence. In thirty years I have seen but two children affected by it. In both the sloughing was rapid in its course, and terminated fatally. Small quantities of mercury had been given in these cases, but there was no evidence of its specific effects having induced this formidable disease; and seeing that mercury is administered to children commonly, and without such a disease following, the conclusion is reasonable, that it did not produce it in these cases.

It is probable that the case referred to as a sequel of small-pox (*vide* p. 177) was also of the nature of a cancrum oris.

MORTIFICATION of the extremities at times occurs. Some years ago a remarkable case presented itself in the person of a female in middle age, whose limbs, through a number of years, gradually, piece by piece, assumed a dry gangrene, and separated from her. The amount of stimulus taken in this case was very large.

In old people mortification of the toes and feet at times takes place, but this is chiefly due to some injury, as a wound of the toe, &c. They are cases that present no special interest. Partial gangrene in old persons, though generally fatal, must not too certainly be deemed so. Cases have occurred in which entire recovery has taken place. One of some interest was in a gentleman of stout habit, æt. 74, in which very considerable patches of dry gangrene of the legs ensued; patch occurring after patch, and yet recovery was complete. This case did not bear stimulants, and cure was evidently effected by a mild purgation and soothing applications.

A case of some interest, of an incomplete state of gangrene, in a lad aged 11 years, occurred in the cold winter of 1838. The lobes of the ears were, as the result of frost-bite, almost of a black colour, remained cold, but did not separate. After some months there was a slight improvement in colour, but no return of warmth. A case not unlike this in its nature and history, affecting the tip of the nose, has also occurred. The application of warm camphorated applications appeared to effect but little improvement or increase of temperature in either of these cases. One may assume there had been some destruction of the blood-vessels, but not to such an extent as to deprive the parts entirely of blood.

BED-SORES, though perhaps not more common than elsewhere, yet occur sufficiently often to be a source of much anxiety to the medical attendant, and great suffering to the patient. Much comfort is derived from placing them upon *dry* linseed meal

poultices, from propping the surrounding parts by small down pillows, and dressing the sores with a light stimulating ointment, or, if requisite, washing them over with a very weak solution of the nitrate of silver—but while all this is doing, the surrounding skin should be washed daily, once or twice, with a lotion of pure spirit in which the bichloride of mercury has been dissolved, in the proportion of two grains to an ounce, and then smearing the surface over with white of egg beat up in brandy. The solution of the bichloride of mercury is a very valuable remedy in these cases. It probably acts by hardening the skin.

SCROFULA may generally be said to present itself under no peculiar form, every variety being at times to be met with. In the treatment, mercury may, for the most part, be said to be injurious; it appears to irritate the system, aggravate the symptoms, and, if there be ulcerated surfaces, to extend them. Much benefit is derived by the careful exhibition of the several preparations of iodine; the absorbent effect, which the ioduret of lead possesses in the case of enlarged glands, is very marked. In children, lime-water and burnt sponge are frequently of the utmost service. When the scrofula locates itself in the mesenteric glands, the external use of the iodide ointments, with the internal administration of cod-liver oil, has proved of signally good service. But whatever may be the medical treatment adopted, there must be exercise in the fresh air, with a good wholesome diet.

CONSUMPTION, though forming a large proportion of the diseases of the chest in this district, is yet very much less frequent than in the county generally, or than in all England (*vide* Table, p. 176). It occurs in all its various forms, though most usually the cases are protracted and lingering. Cretaceous deposits are not unusual, but the progress of the disease is rather to the soft and yellow expectoration. Hæmoptysis is not a frequent complication, if from this term the “sanguineous streak” of an incipient case be excluded. The remarkable pulsation with a “click,” or “*bruit de soufflet*,” beneath the acromial end of the

left clavicle, has occurred in some cases, but it has also occurred where there has been no tubercular disease. It is probably due to some swollen or enlarged condition of the lung pressing on the left carotid artery, or on the aorta at the origin of this artery.

Amongst the cases observed, a few were apparently instances of pure and uncomplicated phthisis laryngea. In these, though no very marked symptoms of any affection of the lungs may have been observable, on examination after death they were invariably found much impacted by tubercular deposit.

A few cases of phthisis, complicated with syphilis, have also occurred. In these the alternations of disease were quite remarkable: at times the chest complaint would appear to be entirely suppressed, while syphilis, in its various forms of periostitis and ulceration, was rapidly progressing; then, on these subsiding, the more fatal affection would develop itself; eventually they died of consumption, in which both the perspiration and expectoration were peculiarly offensive. In one of these cases this was most marked, and to such an extent that, invariably inducing in me a tendency to vomit, I was obliged to relinquish my professional attendance.

Three cases of mental delusion, in connexion with consumption, and after free salivation by mercury, have occurred, with so much similarity, that it may not be inappropriate to refer to them here as instances of phthisis complicated with mercurial irritation. In each the patients presented the usual character of the incipient stage of phthisis; but superadded to this was an impression that their whole system was impregnated with mercury, which in two cases had been taken for syphilitic affection, and in the third for an accidental attack of swelled testicle. So strongly rooted was this impression that they maintained they smelled it in their perspirations, tasted it in their saliva, were convinced it was in their secretions, and that to this, and this only, was attributable the unpleasantness of the symptoms they were labouring under. This state of things in each occurred until the symptoms of phthisis developed themselves, usually suddenly and fully; then the delusion subsided, and the patient went through the ordinary course of a very rapid decline.

Phthisis, in connexion with maniacal attacks, has occasionally presented itself with recurring phenomena. Generally, as the phthisical symptoms developed themselves, the mental disturbance ceased. In a case of this kind a lady implored to be kept from her grandchildren, she felt so strong an impulse to destroy them. A free discharge of a morbid secretion from the lungs took place, and this delusion vanished.

The cases of phthisis which are perhaps the most distressing are those complicated with hysteria. This latter affection appears to prevent the phthisical symptoms from so progressing as to destroy life, but not from harassing the patient; she lives, may be for many years, gradually deteriorating in mind and body, a burden to herself and a grief to all around her. These cases rarely have a purulent expectoration, but one in which there is an opaque, heavy, lymph discharge, raised from the lung with difficulty by a short, harassing cough.

Latent tubercular deposit in the lungs has been in some cases attended by so marked an irritability of the stomach, and such frequent rejection of food, as to divert attention from the source of the disease. In one case this continued till death, when a *post mortem* examination showed a stomach free from inflammation, but lungs filled with miliary tubercle. Some few of the cases have occurred concurrently with a saccharine diabetes, and some have been characterized by an excessive flow of urine; doubtless this is due to the kidneys performing the office of the lungs.

AFFECTIONS OF THE BRAIN AND NERVES are not more numerous than elsewhere, nor present any very marked peculiarities. In the hot summer of 1837, a marked case of inflammation of the arachnoid membrane occurred. An artisan was taken with a vertigo and heavy pain of the head; thus suffering, and pursuing his journey, he fell—was brought to the hospital, passed into coma, and in eight-and-forty hours was dead. An examination showed the dura mater injected, then an inflamed arachnoid, with a layer of purulent lymph beneath it. This layer was continuous over the whole cerebrum; it did not

penetrate into the anfrauosities by which the convolutions are separated; the pia mater showed no evidence of inflammation.

The acute hydrocephalus which occurred in an epidemic form in 1825 (*vide antea*, p. 170), was evidently due to inflammation of the pia mater; the portion reflected into the ventricles was invariably injected with blood; the effusion was there copious, as also in the sac of the membrane dipping down between the convolutions. For the most part, these cases were active in their course, and death early ensued; in a few, however, the inflammatory stage was survived, and a chronic hydrocephalus was the result. The size to which the head was distended in one of these was remarkable. At fourteen years of age the child was living, with a head having a circumference of forty-five inches; its limbs, undeveloped, were like those of an infant. The integuments of the cheek were dragged upwards, by the distension of the head, so as to cover the eyes. In this state, it performed the usual animal functions of existence: when hungry, emitting sounds of impatience. On the death of this child, it was found there was but little trace of cerebrum. It formed only a distended sac with thin parietes of brain matter.

It is probable that the cases of serous apoplexy that occur in advanced life are the result of a chronic inflammation of the pia mater. In one case (23rd May, 1841) the effusion was sanguineous, a grumous blood being deposited throughout its convolutions. This case was sudden in its advent, and tolerably rapid in its course,—the patient surviving only thirteen days. Generally speaking, the cases that have occurred have been more protracted, very insidious in their origin, and difficult to diagnose in their course. Another lady, about the middle period of life, having looked weak and exsanguineous after a vertigo, fell into a trance-like lethargy, in which state she continued for a month. The examination revealed a serous effusion of the pia mater. Of the same nature was the following case:—A gentleman, æt. 26, described symptoms which were anything but urgent, and certainly did not point to the head as

being the seat of difficulty. On walking across the room, he staggered slightly, and crossed his legs in a mode which too certainly indicated the nature of his disease.

Many cases of this nature have occurred in young people over-anxious and overworked at school. Save an occasional darting pain in the head, all that has presented itself has been languor and general exhaustion; the pulse has been first small and quick, then disposed to be unusually slow; and as the disease advanced, a remarkable angularity of the fingers was apparent (a significant and alarming symptom), showing there was some irregular spasm of the limbs. These cases usually assumed, eventually, the form of low fever, with intermitting cerebral oppression; they generally proved fatal. The indications of treatment, save rest and quiet, were very obscure; the contra-indications many, and met one at every suggestion.

APOPLEXY is not markedly a disease of the middle-aged and the robust; for the most part it takes place in the weak and aged. It occurs so frequently on the boisterous changes of the equinox, as also on a cold north-easterly wind suddenly setting in upon previously mild weather, that atmospheric changes must be regarded as proximate causes of the attack. Though this—considering the stormy state of the atmosphere—may be somewhat referable to the electrical condition being changed, yet there can be no doubt, the altered nature of the climate, interfering with free cutaneous perspiration, materially assists in producing the internal congestion. From this greater liability to sudden death in cold weather, Dr. Farr is inclined to believe that many, stated to die of apoplexy, really die asphyxiated from congestion of the lungs.*

A full, heavy meal, after the excitement of a journey, has appeared in several cases to be the immediate cause of an attack. It was obvious that these cases were benefited, even to recovery, by active and sustained purging, and it was remarkable how invariably the discharges were of a black colour, and so continued for days.

* "Letter to Registrar-General," p. 25.

PARALYSIS is not an unusual condition to be seen, though scarcely to the extent it was formerly ; as, in addition to the more common and general causes, there used to be the local one of the too frequent presence of lead in the cider,—the common beverage of the county. Many a painter is still seen with the “dropp’d wrist,” or walking about with more seriously paralyzed limbs. Amongst the middle-aged and the aged paralytic attacks sometimes take place, without the least possible trace of any apoplectic symptoms, and rare instances have occurred in which a complete and permanent hemiplegia has been suddenly induced, without, for a moment, loss of consciousness, or any apparent disturbance of cerebral power.

Of *paralysis agitans* many interesting cases have presented themselves : two, of the eyes. In each of these the patients had been occupied in “silvering” mirrors ; and it was obvious that the fumes of the quicksilver had produced the disease. It is not improbable that the inordinate use of mercurials in certain irritable and nervous subjects is the main cause of this disease ; it appears to be entirely local in the nerve tissue, and not to shorten life. Some of those afflicted with the various distressing states of shaking palsy have been long-lived people. One, who is now living, has for years had almost every superficial muscle in the body in a constant agitation. Some forms of wry neck appear to be of the same nature, and to have a common origin.

CHOREA occurs every now and then, and sometimes epidemically ; that is to say, several cases present themselves at the same time, usually in winter, or during the cold winds of spring. In December, 1847, at the time the influenza was prevailing, several cases occurred. They were always in weakly-framed young persons, with an exsanguineous look ; nothing appeared to benefit them so much as the sesquioxide of iron combined with rhubarb and aromatics. This disease has generally occurred in very young persons, and the attack shown itself very apt to recur until puberty became fully established.

Of the nature of chorea was a remarkable spasmodic affection

which occurred in a lady of the middle period of life. Every now and then her limbs—an arm or a leg, as the case might be—were thrown into sudden and involuntary spasm, so that, if holding anything, it was violently propelled from her, or, if standing, she might be nearly precipitated to the ground by a leg being jerked from under her. So severe were these spasms, that invariably there followed a bruise on the offending limb from the rupture of some superficial vessels. This tendency lasted for some months, but was entirely recovered from.

DELIRIUM TREMENS is an occasional disease in this district. It occurs only in the male. I have never seen a case in the female, though this sex is not here free from the vice that may induce it. It occurs mainly in the spirit-drinker, never in those who only drink cider. Hence the labourer is rarely the subject of an attack.

The treatment in delirium tremens is always attended with anxiety. Doubtless, in many cases the sustained, and, as regards quantity, remarkable use of opium is advantageous; but after its successful adoption in a few cases, it may be given in another with fatal results. The difficult point to decide is, when opium is useful and when injurious. The following indications may not be unworthy of consideration. If the skin be dry, the pulse firm and somewhat hard, and the pupil dilated, opium is indicated, and may be given fearlessly till the critical sleep is induced; when, however, the skin is freely exuding a perspiration, the pulse soft, feeble, and quick, and the pupil of the eye contracted, opium is contra-indicated: it is probable that there is now establishing itself a tendency to serous effusion of the brain, and that opium would induce a fatal sleep. Since the use of digitalis in delirium tremens has been advocated, two cases have occurred in my practice, in which I could not venture to advise a continuance of the administration of opium: in these, the use of digitalis was attended with an evident and prompt success. I believe it to be a very valuable addition to our mode of treatment in this disease. In one of the above cases, I feel assured that a further dose of a few drops of

laudanum would have caused a stupor from which the patient could never have recovered.

Ether, stimulants, and all alcoholic drinks, have obviously been attended with immediately bad consequences: the first has not infrequently induced the epileptic convulsions so common in these attacks. Though these convulsions add much to the formidable nature and danger of the attack, their occurrence does not appear to complicate the treatment, or to contraindicate that which is applicable without their presence. This is very certain, that delirium tremens, whether with or without epileptic convulsions, will not bear depletion, and that the adoption of blood-letting, in any form, is injurious, and can only be regarded as a fatal mistake.

INSANITY.—As consulting physician to a public institution* for the insane, a large amount of those so afflicted in this district has passed under my observation. A few points appear to possess an interest. The cases have been somewhat local, showing evidently, on the one hand, the force of hereditary tendencies, and on the other the depressing influence on the mind of certain localities. The cold damp tract of clay soil in the culmiferous country yields, relatively, more cases, especially of melancholia, than the warm red soil. Amongst females pure cases of mania occur more often than amongst males, and at an earlier age; doubtless many of these cases are due to the hysterical tendencies of the sex. Amongst the males the attack is almost always characterized by a monomania, and sometimes it is mixed up with, and determined by, a fit of gout.

If the digestive organs be unimpaired, and for the most part they are, long life in both male and female is consistent with insanity, especially in the female. The ages of some residing in the Lunatic Hospital in this district are very great.

In the male numerous cases of insanity, connected with a general paralysis, present themselves; no case has occurred in the female. These cases are a curious study,—the trembling tongue and faltering speech, the unsteady gait, the curved

* The St. Thomas's Hospital, near Exeter, for Lunatics.

spine—its leanings varying from day to day—mark the progress of physical disability. The trifling attempts at occupation, the well-thumbed, but unread, book, and yet withal the personal enjoyment of existence, an universal expression of happiness, and the boast that all about them are their own large possessions. The mind, thus amusing itself with trifles, indulges in a narrow self-satisfaction, till it gradually, amid inane smiles, becomes too weak to take observation, or to compare its ideas. In the course of this disease epileptic attacks are not infrequent, inducing often an apoplectic coma, that the inexperienced would think could never be recovered from. It is remarkable the amount of these disturbances the patients can undergo consistently with a prolonged existence of some three or four years. Eventually dementia becomes confirmed.

Insanity, complicated with epilepsy only, is generally accompanied by more irritability, but does not run so rapid a career as in those cases where it is complicated with a general paralysis. They, however, as certainly pass into a dementia.

Hypochondriasis is a disease of the male sex. Injury to the stomach or neighbouring viscera is often the cause of a permanent hypochondriasis. At the same time, three cases were about a year since under my care which had thus originated. The hardening of the tissues of the stomach by spirits or strong wines also occasionally produces it. Cases of religious melancholia are most frequent in females; in some the agony and distress experienced is excessive.

Whatever may be the form of a chronic insanity, the urine is usually somewhat pale, and free from lithic acid deposits; in acute attacks the urine throwing down lithates is a favourable sign. The old notion that the insane emitted a characteristic smell is certainly a mistake; this smell was solely due to want of cleanliness.

There is as much variety of mind in a lunatic asylum as there is in the busy world: some are vain, some humble, some industrious, some idle. The industrious are happy, the idle miserable. Much can be done in all cases to ameliorate the mental condition, and improve even to restoration, save in those

where it is connected with general paralysis or epilepsy; with these complications the mental faculties invariably go from bad to worse. In other cases many are cured—about one-half—the remainder are rendered tranquil, and become reconciled to their position, enjoying much happiness detached from the excitement and annoyances of the external world.

In men, many of the cases are mixed up with alcoholic intemperance. These cases present two broad varieties—those who, having primarily and essentially healthy brains, thus induce temporary functional disturbances, and those who, having unsound brains, thus arouse this unsoundness into activity.

In the former the delirium, accompanied by headache, exhibiting during the paroxysm little or no reasoning power, and characterized by a present loss of memory, is only excited by the immediate use of alcohol. The mental disturbance having quieted down, the delusions are seen to be evanescent, and the brain, though it may not be in an entirely sound state for some weeks, eventually recovers its former healthy condition. Those in whom there is an unsound mind are more easily excited by alcohol, show no evidence of headache, and the delirium often recurs after the immediate effects of the alcohol are passed off: there is, moreover, even during the delirium, some evidences of a reasoning power (though morbid), with memory of the attack. The delusions are, however, more persistent, perhaps entirely so.

On reviewing the many cases of insanity that have passed beneath my observation, and the phenomena that have characterized them, the following conclusions are arrived at:—That maniacal delusions are false impressions, not removable by an appeal to the reasoning powers. That insane hallucinations are false impressions, entertained in opposition to the evidence of the senses. In themselves, the existence of delusion and hallucination is not insanity; but if existing under the above conditions, is evidence of it. That unsoundness of mind consists in a want of a healthy action in the functions of the brain, whereby the mental faculties remain undeveloped or become impaired; that this want of development or impairment varies in degree, so that there may be a sufficiently good

practical efficiency or total incapacity.* The practical physician enunciates, with truth, there is mental unsoundness; the lawyer caps this with the absolute condition, "and therefore incapable of taking care of himself and his affairs." This the practical physician does not recognise as a necessary corollary; hence difference is established, issues are confounded, and there arise the numerous contradictions so often witnessed in courts of inquiry as to mental fitness.

The treatment generally adopted has been, in acute mania, the soothing and mildly aperient, with a carefully regulated diet, and, in some rare cases, depletion. The soothing means used are effervescing salines with hyoseyamus, the occasional administration of the liquor opii sedativus, or salts of morphia, and warm bathing. The aperient consists in mild but effective doses of rhubarb, colocynth, or salts and senna. The depletive means are usually mild mercurials, combined with antimonials or digitalis, and, where tendency to local inflammation is shown, leeches; general bleeding never. The experience of its employment derived from those cases admitted after it had been freely practised, shows it to be evidently injurious, breaking down the constitution, and conducing towards an uncontrollable mania, very apt to settle down into dementia. The diet adopted on the first ingress of an acute attack is, for the most part, low or only slightly nutritious, as tea, broths, &c., but after a few days a more nourishing or even stimulating diet is generally required. Of course all this is often set at naught by the violence of the patient.

In chronic mania, a general soothing treatment, combined with good diet and a strict attention to the bowels, while outdoor exercise is enjoined, and light reading and quiet amusements, with a view to occupation, promoted, is attended by very happy results.

PUERPERAL MANIA is not a frequent disease. A few cases

* A madman may reason with acuteness, and yet be found deficient in the practical application of the results of this reasoning. Hence arise the inconsistencies of madness, and which are as if he could not reason.

only occasionally occur, and these are chiefly due to debility, to mental exhaustion immediately after confinement, or, to some puerperal inflammatory condition. If not complicated with a preceding morbid condition of the brain, disposing to insanity, these cases do not recur, a second attack is very rare; but if the parturition is only the exciting cause of mania, in those so predisposed, it is apt to recur.

In acute puerperal mania, great benefit has been derived from the adoption of the mode of treatment above mentioned, combined with sedative injections and warm bathing.

FRIGHT.—Of severe nervous affections induced by fright, many have occurred. G. E., a tradesman, aged 70, in prosperous repute, hale, and well-looking, going (1837) into the accustomed tradesmen's room in the hotel, was jcered by the company as looking ill, and not being "long for this world." This so shocked him that he fell into a tremor, spoke in a tremulous voice, burst out into perspirations, and died within three days. His only idea was of his danger, and this fear never left him.

A young woman in service had met with some trivial accidents, and then broke an ordinary toilet looking-glass. This excited in her some singular dread, founded on the superstition that it was fatal to break a mirror; she retired to bed, and died in a few hours. An examination of the body revealed well-nourished, healthy organs. In the lungs there was a small concretion of calculous matter, but no tubercle.

In the Christmas of 1847 a small tradesman was told by way of joke that his son was dead; it so affected him that he passed into a tremor, and this, more or less, lasted for three months. Opium always added to this man's agitation; he was benefited by valerian. A lady was disturbed by a fire, which burnt her house down; it induced diarrhœa, and this tendency, on any excitement, has continued for nearly thirty years.

In 1848, at Cullompton, on a great fire taking place, one of those burnt out was seized with a palpitation and a painful sensation down the left arm, and this recurred many times

afterwards during the succeeding months. The sounds of the heart were natural, but the impulse was feeble. There was at times a convulsive action of the heart and diaphragm.

1860.—A man was shocked on the occasion of ^{*}his child being drowned; he remained agitated and restless, with sleeplessness. This case was partially relieved by opium and antispasmodics, but evidently his intellect was much shaken.

EPILEPSY.—Many cases of this affection present themselves for treatment: some connected with removable causes, as catamenial derangement, intemperance, stomach disorder, while others are idiopathic; all, during the attack, show evidence of turbulent action of the heart. The former frequently yield to remedies applicable to the primary affections; the latter, though more intractable, yet have in many instances been much benefited, and in some few entirely relieved, by a sustained exhibition of the valerian and hydrocyanic acid, together with the daily use of some slight tonic aperient and antacid, as rhubarb combined with soda. These remedies have proved in several instances so efficacious as to be considered particularly valuable.

Attacks of epilepsy have been occasionally induced by inhaling poisonous gases. A young man (June, 1837) engaged in cleansing a sewer had a violent epileptic convulsion, then fell into coma for five hours, from which he awakened in an active delirium; he then complained of pain in the head, cramps of the arms and legs, and these were very severe; pulse small and quick. After three days, during which the symptoms gradually subsided, he recovered. The treatment was bleeding by leeches and purging. Another man, falling into a sewer, where foetid vapours, as sulphuretted hydrogen, &c., were pent up, also experienced an epileptic convulsion, followed by a maniacal attack. He recovered, with slight paralysis of one side. In another case, a young female slept in a newly-painted room. She fell into epileptic convulsions, which were followed by an imbecility. Analogous to this latter case was that of the child of a painter, who, inhaling

the vapours of the materials used by her father, fell into a cataleptic stupor.

Of CATALEPSY, beside the above, but two cases have presented themselves to my observation; these, however, were very marked,—the one in a male, the other in a female. In the male there was evidently serious nervous mischief, and he subsequently passed into coma. The catalepsy in the female was associated with hysterical symptoms.

HYSTERIA, Proteus-like, assumes here its various anomalous forms, and is often equally troublesome of cure as in other places. A very deceiving and tedious affection of this nature, of which many cases present themselves, is a complication with pectoral irritation. It presents many of the symptoms of, and may be mistaken for, a tubercular consumption. It is characterized by an almost incessant dry, hacking cough, which no medicines, administered directly for its allaying, appear capable of subduing. The pulse is small and quick, the skin dry, the countenance anxious, the lips parched, and the face disposed to be congested, the nights sleepless. The expectoration is serous, sometimes slightly bloody, but very different from the streaks of blood mapped out upon mucus in a true phthisis. It is dark blood diffused in the serosity, and, if water be added, mixes easily and freely with it. The uterine condition usually attendant on this state is that of menorrhagia; though cases occur with the opposite condition of an amenorrhœa. This state of things will continue sometimes for years, in spite of every endeavour to relieve it; it is, however, considerably alleviated, and sometimes cured, by the exhibition of the warm gums and tonics, as assafoetida, myrrh, iron, acids, &c. Opiates never appear to me to give the least relief.

Allied to these cases are those remarkable instances of hysterical APHONIA, of which several have come under my observation. A lady of somewhat mature age, but afflicted by anomalous spasms of the heart, became the subject of aphonia with salivation. The salivation was so profuse as to interfere

with her taking medicines or even a due amount of nourishment. Nothing appeared to relieve her, till one day a sudden surprise cured both maladies. This lady, a few years afterwards, became the subject of an ovarian tumour.

The "hysterical breast," of which cases only rarely present themselves, are very persisting; swollen, pendulous, mapped over with blue veins and painful, nothing appears to cure, and but little to relieve them.

Though, relatively, hysteria is less a disease of the poor than of the wealthy, occasionally it occurs in the former, and dispensary practice yields its cases.

In 1847 a notable case occurred: a young woman, for years hysterical, had lain in bed powerless and dumb; in a thunder storm she spoke—she continued her speech—when, becoming hysterically delirious, she used her limbs.

These cases require great tact in their management; they are to be viewed as diseases of the mental system in those physically weak, and must be treated accordingly.

NEURALGIA OF THE NERVES OF THE BACK, or, as it is more generally styled, SPINAL IRRITATION, is a disease associated with hysteria, but is not essentially hysterical. It is far from unusual in this district, but its relative frequency here and in other districts there are no available means of comparing.

It occurs almost exclusively in females from the seventeenth to the thirtieth year, of excitable minds, and whose natural feelings are controlled by circumstances; it is usually met with in connexion with some uterine derangement, as dysmenorrhœa. The ordinary symptoms are, pain in the back part of the head, and in the chest, more especially at a point under the left mamma, often affecting the breathing; sometimes the pain extends over the abdomen; these variations in its seat mainly depend upon the classes of nerves affected, whether they be the cervical, intercostal, or lumbar; the diaphragm is often spasmodically contracted; the tongue usually coated by a thick slime; the eyes inclined to be staring; the pulse quick and small; occasional painful vomiting; and, more often than otherwise, a short,

constant cough, which materially adds to the distress of the patient. On examining these cases more particularly, there will usually be found on one or both sides of the spine, more generally on the left, a tenderness on pressure, which is found to be by the side of the vertebral column, opposite to the exit, and along the course, of the spinal nerve. It is on these grounds that they are to be regarded as cases of neuralgia, and not of spinal irritation; for if this latter were the source of the disease, the tenderness would probably be found at the origin of the nerve, and consequently at a point more or less elevated above the intervertebral foramen. In some of these cases the spine is very considerably curved, but the curvature is attended with these peculiarities, that it is neither angular nor constant; sometimes the leaning sides change, and that in very short intervals of time. These symptoms, heavy as they appear to be, may continue for months, nay, for years, and yet the patient does not lose flesh; on the contrary, without being fat, rather enjoys a state of *embonpoint*.

The treatment is too often most unsatisfactory; relief is, however, frequently obtained from the adoption of quiet, blistering the points of nervous irritation, the occasional use of leeches, but not to the extent of materially depleting the constitution, and from the steady perseverance in purgatives combined with croton oil, or the tartarized antimony; the use of a combination of the oxide of zinc and hyoseyamus has also appeared beneficial.

In these cases, after the pain has been removed, the mind very frequently retains the impression that all power of motion is lost; and, unless this be counteracted, it leads to the melancholy result of an hysterical paralysis.

Some of these cases, however, are clearly due to strumous or rheumatic swellings of the intervertebral substance, and it is this which induces the excessive pain and the partial paralysis. This disease is for the most part chronic, and apt to recur after recovery. In an acute and exaggerated case which occurred a few years since from exposing the neck to a cold easterly wind, the cervical cartilages and ligaments became the seat of the most

agonizing suffering. Death ensued after a few days. In another, where, from taking cold during a long ride in the rain, the lumbar and sacral cartilages were affected, there was at times much tingling down the legs, with disturbance of the power of the rectum. Colehicum and guaiacum, especially this latter, have proved useful in these cases. Where there is complication with venereal affections, the hydriodate of potash and cinchona bark have invariably given relief.

TETANUS AND TRISMUS, as the result of injuries, are not unusual. These cases occur chiefly in mid-winter and then in the extreme heat of summer. The following may be mentioned as cases originating in somewhat unusual causes. A case of the former (tetanus) occurred during the excessive heat of a very hot summer, and was seemingly caused by the irritating effects of mercury, taken to profuse salivation for a syphilitic attack. The patient died. A case of trismus was caused by inanition preceding childbirth; the patient recovered by judicious feeding and the careful exhibition of stimulants and sedatives: another occurred in consequence of extreme vexation, and, though alarming in its character, yet eventually did well; this patient stated that he had suffered an attack previously, which was caused by having had administered to him, in mistake, a large dose of hydrocyanic acid.

In traumatic cases the most satisfactory remedy has appeared to be full doses of quinine, but even with this the mortality is great.

A case of irritative inflammation of the spinal cord that occurred in 1838 was curious in its origin and symptoms, and may not be altogether different in its nature from tetanus. A female, in sawing wood, injured the thumb; the wound healed in due course, but some three weeks afterwards a tendency to vomiting supervened, and vomiting could be induced by pressure over the lower thoracic vertebræ, as also on pinching the thumb. She entirely recovered. The treatment was mainly the application of leeches and counter-irritants in the course of the spinal column.

LARYNGISMUS STRIDULUS occurs usually after a severe winter; its cause is not, however, from the cold of the external air, but the adopted confinement in heated rooms, and the sameness of life to which the child has been submitted. The desire these little patients show to leave the room in which they are confined is remarkable. The most satisfactory treatment has been during the spasm to dash cold water on the face and chest, then in the interval, such light tonics as may suggest themselves, but the main point is fresh air; and, without fatigue, such mental amusement as an infant can enjoy. In those cases which have so far progressed as to be associated with general convulsion and tonic spasm of the limbs, the careful use of opium has been not only beneficial, but specifically curative.

NEURALGIA.—Neuralgic affections are not frequent. Those that occur partake of the character of a *tic-douloureux*. They but rarely have in this district their cause in a marsh miasm, but for the most part in some personal origin. The most formidable case presented to my observation was from epulis after scurvy. The attacks were frequent, sudden, and maddening. Any attempt at deglutition brought on an attack. During many days, the only opportunity of getting food into the stomach was immediately after a paroxysm, when for a few minutes the disease appeared to have vented its powers.

Of a neuralgic character are some cases which have occurred, in which there were singular local errors of the senses; two of depraved smell and taste have come within my observation. One was from a fall from a horse; this was followed by everything being offensive to taste and smell; it was to such an extent that food and flowers were repulsive. It induced a sociable man to decline society. The other was in a young person, probably due to some irritation of the membranes of the nose, caused by a diseased tooth. It was effectually cured.

DISEASES OF THE HEART AND GREAT VESSELS present in their features nothing very remarkable; they occur in about the usual average.

As previously mentioned, many of the affections of the heart are referable to metastasis from rheumatism. Many of the hearts which have a blowing murmur from this source are recovered from, and many so adapt themselves as really to be of little or no inconvenience, nor apparently to shorten life. The most dangerous affections are those which, revealing little by the pulse or to the ear, give the patient sudden pain or anxiety. A not unfrequent break up of health in this district is in advanced age, a slight hurry of breathing, with some anxiety about the heart; these symptoms often herald a fatal dropsy of the pericardium. In early life, pain and palpitation are not unusual, but these symptoms are rather due to an excited organ from over stimulation.

Two cases of air in the pericardium have occurred; they were characterized by slow, heavy pulse, pain and anxiety over the heart, and depressed feelings. One slowly recovered, the other died, and air was emitted on puncturing the pericardium. The physical sign of these cases was very complete, the resonance over the region of the heart being well defined.

Some cases of inflammation of the arteries have been instructive—the one in a lady aged 40; during two months, with dyspnœa and other pectoral embarrassments, there was pain in the chest of the most acute kind. On examination after death, the pulmonary artery was seen vividly inflamed in patches, with here and there lymph exuded. In another the arteries of the legs took on this inflammatory character; the pain was beyond endurance as each fresh portion of artery was attacked; sphacelus of the legs eventually occurred, and death resulted in about five weeks after the first attack. On examination, it was seen that the plastic inflammation had sealed up the arteries.

In wasting diseases, such as consumption, a pain not so severe, often takes place in the veins. This phlebitis is relieved on the appearance of an œdema, which usually is discoverable a few hours afterwards.

HÆMORRHAGE.—There is probably an ordinary liability to hæmorrhages in this district, and instances are not wanting

in which there is that peculiarity of constitution in which dangerous discharges of blood ensue on the slightest causes. There is a family residing in the middle of the county of which so many members have been afflicted, that they are styled the "bleeding family." A case that occurred here after the extraction of a tooth, and which occurred in a gentleman who, on other occasions, had shown the same alarming tendency, great relief was afforded by mercurial purges.

A young lady, very subject to epistaxis, assured me she always found remedy in the plan suggested by Negrier, of elevating the arms. The rationale of this is, that when a person stands in the ordinary posture, with the arms hanging down, the force needed to propel the blood through the upper extremities is about half that which would be required if the arms were raised perpendicularly above the head. But since the force which sends the blood through the carotid arteries is the same as that which causes it to circulate through the bronchial arteries—and there is nothing in the mere position of the arms above the head to stimulate the heart to increased action—it is evident that a less vigorous circulation through the carotids must result from the increased force required to carry on the circulation through the raised upper extremities.

LARYNGITIS, as an idiopathic disease, rarely happens: sometimes in the spring, when cold winds prevail, cases occur, but they are usually amenable to treatment. Laryngitis is for the most part complicated with pectoral or pharyngeal attacks; the treatment adopted, besides external depletion and counter-irritants, is the free exhibition of nitre, with calomel and antimony.

DISEASES OF THE RESPIRATORY ORGANS.—These are in this district less than in Devon generally, and considerably less than in all England (*vide antea*, p. 176). The same was also stated of phthisis, so that we may assume this climate is favourable to a healthy pulmonary development. A large proportion of the cases which occur consists of simple inflammation of the

bronchial vessels. The symptoms of this inflammation are usually those of a feverish cold, with coryza; generally speaking, it is not obstinate, and yields to mild treatment, excepting in persons advanced in years. Chronic catarrh, amongst the lower orders, is by no means uncommon, while amongst the upper classes it is comparatively rare. Bronchitis for the most part prevails during the winter and spring months, doubtless due to exposure to cold in the damp which prevails at these seasons. In winter season the best remedy is a room, the atmosphere of which is warmed and dried by a fire.

PLEURISY was formerly a much more frequent disease than in recent years. Thirty years ago cases frequently presented themselves, requiring, and relieved by, a free venesection; latterly the cases have been mixed up with rheumatic attacks, and often are distinctly traceable to a metastasis of rheumatic inflammation—always a very dangerous form of the disease. Chronic pleurisy, with rapid effusion, often occurs in those whose system has been loaded by a black blood from the overstimulation of alcoholic drinks. These cases are protracted; but, if there be no liver nor other visceral diseases, they eventually do well; doubtless, pleurisy in this less urgent form is more frequent than is generally supposed, for it is rare in *post mortem* examinations to see the pleura entirely free from indications of those previous inflammations indicated by the effusion of lymph or a lesser amount of adhesions of old standing, and the origin of which had never been referred to by the patient, nor expected from his general condition.

EMPHYEMA is occasionally met with. Prognosis in these cases is to be much influenced by the state of the lung; if the deposit of pus be solely due to pleural inflammation, paracentesis, it is more than probable, will be successful, and result in perfect cure; if, however, there be tubercle in the lung, the operation is most unsatisfactory, and perhaps had better not be performed. If there be only a hepatized lung, the result of simple inflammation, the operation is doubtful as to its results, but had better

be performed. Three cases under my care have relieved themselves spontaneously, the contents of the pleura being discharged through the lung. In 1841, a lad about ten years of age had an empyema, and eventually showed, between the sixth and seventh rib, a disposition to discharge externally; this was assisted by an incision, with only the evacuation of about a tea-cupful of pus. The following day the little lad vomited up a very large amount of pus; he rapidly recovered. The first portion evacuated was evidently a circumscribed abscess, and separate from the large amount contained in the pleura.

PNEUMONIA occasionally occurs, almost always in the winter and spring seasons; at other times it is not an idiopathic disease, but complicated with fever or tuberculosis, and this is its more frequent form. It is usually ushered in by a sharp local pain. If seen immediately on an attack, the loss of a few ounces of blood is most useful; but if the disease is so far established that the lung has become infarcted with a viscid exudation, then the bleeding is injurious.

The gangrenous pneumonia appears less determined by temperature than by other epidemic influences. It generally occurs when low fever prevails. It is a most fatal form of the disease, and recovery is rarely its termination. Should the patient survive the attack, the after consequences generally exhaust the strength.

PERIPNEUMONIA NOTHA is essentially a bronchial inflammation, and a disease of cold weather; it rarely prevails unless there be much cold moisture—the occurrence of snow, with a continued low temperature, often determines the occurrence of the disease. It requires the use of warm expectorants, with a generous diet. It was not prevalent last winter; but a case that occurred was much relieved by the use of the old-fashioned mist. ammoniaci, the bitterness of which had been counteracted by the addition of the new remedy, chlorie ether. This proved a most useful remedy, assisting the formation and discharge of the creamy-

looking muco-pus so characteristic of, and so beneficial in, this complaint.

A CATARRHAL PERIPNEUMONIA is often epidemic amongst children, and the urgency of the attack greatly depends on the relative amount of each inflammation. The catarrhal form is protracted, and with care generally recovered from; the pneumonic is dangerous and rapid in its course. They both set in lightly, and without creating alarm; but when the parenchymatous tissue of the lung becomes the seat of the inflammation, the symptoms rapidly assume an urgency; the breathing is oppressed, the countenance congested, and there is a restless agitation not to be subdued. These cases are much benefited by small and frequent doses of nitre and ipecacuanha; the ipecacuanha is better than antimony in any form, as it causes less vital depression, and is more effectual as an expectorant.

ASTHMA, though occasionally, is yet rarely met with, excepting in old people, and then is so complicated with the more permanent sources of dyspnœa, as scarcely to deserve the name. It occasionally occurs from some permanent thickening at the roots of the lungs, or a hepatized mass in the depending portion of the lower lobes. In the stout and robust it is most often found to be associated with pectoral or perhaps cardiac disease.

Asthma, terminating in consumption, is frequent amongst the labourers in the whetstone quarries on the Blackdown hills. Whilst grinding the stones they may be said to inhale a silicious atmosphere. If standing behind them when at work in the rays of the sun, the silicious cloud given off from the lathe is quite iridescent. They (men and women) only work a certain time, after which, dressed in their best attire, they proceed to enjoy themselves. The complexion is clear and beautiful. When asked, knowing as they do that so many young people die from the occupation, why they engage in it, the reply is—"Good wages and easy work, which others would have if they did not."

Connected with an asthma, two cases of an obstinate sneezing have occurred—so obstinate as to have, during the paroxysms,

quite exhausted the patients. It may be inferred that in these cases the Schneiderian, as well as the bronchial membranes, were in a state of irritation.

That form of asthma known as "Hay fever," has its victims here. In one case it is invariably induced by the powder of aromatic herbs, valerian, &c.

It has latterly been a fashion, in this part of the world, to starve asthmatics, and, as far as the attacks themselves are concerned, it appears to have succeeded, but at a cost to the strength and health which those submitted to it have told me was worse than the disease. Doubtless, a careful diet is of the first necessity, but idiopathic asthma is a disease of debility, and always occurs in the feeble and the spare.

DIGESTIVE ORGANS.—Diseases of these organs appear to be relatively less in Devonshire than in all England.

GLOSSITIS.—I have never seen an acute case of this disease: in its chronic form, two of the cases were very instructive. In the one a just doubt was entertained of its malignancy; in the other none, and to relieve the distress of the patient an operation was resolved on. Nevertheless, from certain indications, a syphilitic taint was suspected, and the use of the hydriodate of potass suggested; it was attended by almost instant relief, and cure was the result.

STOMATITIS.—Apthous sores of the mouth and tongue are by no means unfrequent,—most often in complication with other diseases, though sometimes they occur idiopathically; in either case they are very troublesome. They usually commence in a small vesicle, which, breaking, permits the exudation of a little fluid. After this there is left an abraded surface, which, if not attended to, becomes an ulcer, usually as obstinate as it is painful. The old remedy of borax and honey is very serviceable before the ulcerated surface is established; after that it appears of no use. The ulcers are most easily cured by a weak solution of lunar caustic, or, what is even better, a weak ointment of the

nitric oxido of mercury. At the same time that this local treatment is adopted, the exhibition of a solution of Epsom salts in the compound infusion of roses has been given with advantage.

ŒSOPHAGITIS.—A form of œsophageal affection more often occurring than is supposed is the occasional vomiting of a clear, neutral fluid, secreted exclusively in the œsophagus: the quantity voided is sometimes very considerable, is at first brought up with difficulty, and after much urging—more easily afterwards—and there is this peculiarity, that the vomiting of this fluid is never associated with the contents of the stomach. It may occur immediately after food has been taken, and yet of this there is not a trace. There is probably a spasmodic closure of the cardia during the act of vomiting. These cases have chiefly occurred in females; and, though not always, in those of an hysterico-strumous constitution.

STRICTURE OF THE ŒSOPHAGUS is but very rarely met with; in 1833, however, two cases occurred, and in these the disease appeared to consist of an hypertrophy of the submucous tissue, consequent upon inflammation: its origin in both was referred to attacks of influenza in 1831.

DISEASES OF THE STOMACH.—Ulceration of the stomach in females of a chlorotic temperament has at rare intervals of time induced fatal perforation. A case that occurred, August, 1838, in a young woman, aged 31, the antecedent symptom had been only an occasional pain after eating; the perforation took place after some unusual exertion, at 10 a.m., and she survived it only 24 hours. A *post mortem* examination showed the peritoneum slightly inflamed in patches, and a large quantity of serum in the cavity of the abdomen, in which were floating masses of coagulable lymph. In the large arch of the stomach was a defined aperture a quarter of an inch in diameter; its sides were even, and of a black colour. Immediately opposite was another of a fresher colour, which had corroded the villous coat.

Of those curious cases in which the stomach becomes im-

mensely dilated, the dilatation was in the larger arch, and was obviously caused by obstruction at the pylorus from scirrhus. In the last case I saw of this, the presence of the *sarcinæ ventriculi* was constant in the matters vomited, and probably had been so in the others, had the search been made.

GASTRITIS, as an idiopathic disease, rarely occurs. The cases met with are generally the result of some irritant. A very marked case from arsenic was first attended by vomiting, a short period of pain, and then by stupor; this sleepy, insensible condition very early set in, and continued till death ensued, which was within twenty-four hours. The stomach was intensely inflamed in small lines over the enlarged rugæ.

Chronic gastritis is not unfrequent, and often induces the several casualties of stomach diseases. A frequent and most distressing symptom in these cases is an inordinate pulsation in the cœliac axis; at times to such an extent that the bruit and the throb may almost induce the suspicion of an aneurismal dilatation. Sedatives and antacids usually, after a time, relieve it.

PERITONITIS, in 1827, was very frequent; in common with other acute inflammations of the serous membranes, it called for the most prompt treatment, and bore with singularly good effect large bleedings, both local and general; in fact, abstraction of blood, together with the administration of calomel and opium, appeared the only remedies to be relied on. Since the above period it has been comparatively rare, unless when occurring in the puerperal state. As an illustration of family predisposition, the following may be cursorily alluded to. A young man, in 1833, who was labouring under peritonitis, after an illness of ten days, died. A *post mortem* examination exhibited the peritoneum in a state of high inflammation, covered with a copious effusion of puriform lymph, by which the folds of the intestines were agglutinated together. Two years subsequently a brother of the above died, under similar circumstances. On the *post mortem* examination, so like were the

appearances that a drawing of the one would most accurately have described the appearances noticed in the other. It was then mentioned that in a different part of the county another brother had died only a few months previously with much the same symptoms; no *post mortem* examination was made. Each of these cases of peritonitis occurred at a time when the disease was by no means prevalent, so that they must be entirely attributed to family predisposition.

ENTERITIS is not now a very frequent affection. A case of this disease occurred in a young lady from taking Blair's pills—a nostrum which is understood to contain colchicum; patches of inflammation were induced, and a fatal constipation was the result. The case was remarkable from the long continuance of the constipation—between five and six weeks—without any very marked iliac passion.

Other cases of iliac obstruction have been relieved by the free injection of bland enemata, till the bowel was distended by the fluid, or by the injection of ether and antispasmodics, and then by the free use of opium, the great point of practice being to avoid, as soon as the fact of ileus is ascertained, the inconsiderate use of aperients.

Occasional cases occur of what appears to be spasmodic stricture of the bowels, without enteritic complication. Those who have once had this form of obstruction are liable to its recurrence. Usually they are of the gouty or rheumatic constitution, and, not improbably, the spasm is of a rheumatic nature.

The sheet anchor in all these cases is opium. Until the spasm is relieved, aperients have no other effect than doing mischief to the membranes, increasing the sickness, and depressing the powers of life.

The LEAD, or, as it has been called, the DEVONSHIRE COLIC, is now no longer frequent, excepting in painters and those who may accidentally be subjected to the influence of lead. Since the time Sir George Baker showed that the prevalence of this

disease in Devonshire was owing to the employment of leaden vessels in the process of making cider, which was then the custom throughout the county, these have been abandoned, and, with the cause, the disease has subsided. Devonshire now no longer particularly deserves to give its name to this affection of the bowels. Nevertheless, the specific constipation, with colic pains from lead, is still occasionally met with, chiefly amongst painters. Seeing their liability to rheumatism, it is not improbable this colic is also rheumatic.

Obstruction from intussusception is a more intractable disease; but a case of spontaneous cure in a young child has offered itself, in which, after there had been evidence of the disease for nearly a fortnight, some inches of the intussuscepted bowel was thrown off. The patient recovered.

DYSPEPSIA prevails to a considerable extent. Improper diet and anxiety of mind are prolific sources of this affection. It appears often directly referable to deficiency in clothing, especially during the night; to the free indulgence in cider; to the quantity of hot drinks consumed, in the shape of weak broths, tea, &c., and by which the tone of the stomach generally is materially impaired. In the lower orders the want of a proper diet is as injurious as the abuse of abundance amongst their wealthier neighbours. The more common form which it usually assumes is that of a gnawing pain in the region of the stomach, palpitation of the heart, and the eructation of flatus, and occasionally of a small quantity of acrid fluid; the more copious flow of gastrorrhœa is less frequent. The treatment generally found most useful has been the exhibition of mild tonics, as the trisnitrate of bismuth with soda, combined with a little rhubarb; and if the pain be excessive, the addition of two or more grains of Dover's powder; at other times, the bitter infusions, with soda, the nitrate of silver, or lime-water, have been serviceable. However beneficial these medicines may be, yet in too many cases an ill-regulated and insufficient diet prevents satisfactory recovery.

The generation of wind in the stomach is often the source of

much distress, and, doubtless, is the burden of many a tale. Its generation in some rare cases has been truly wonderful; discharged in rapid and loud volleys, it is evolved in quantities so large and so continuously, as almost to induce suffocation in the patient.

Cases of pure gastrorrhœa are now and then met with. In some the quantity of fluid voided is immense; these cases have generally occurred in females in whom there was some considerable and very prominent uterine irritation, or in those worn down by mental anxiety and over-exertion. The medicines giving greatest relief are saline draughts in effervescence with an excess of alkali, the liberal and long-continued use of *James's Powder*, and sometimes sedatives. Acids or the astringent bitters rarely seem serviceable; on the contrary, rather appear to aggravate the symptoms.

The seasons of the year in which dyspepsia prevails to the greatest extent are spring and summer; by far the largest proportion of cases takes place in the month of May. Generally speaking, the persons affected are about the meridian of life; forty-one being the average age. Females appear to suffer in a much larger proportion than males.

DISEASES OF THE PANCREAS.—In the above, dyspepsia has chiefly been referred to as evidence of a disordered condition of the functions of the stomach, or of disease in the organ itself, and, to a great extent, such appears to be correct; at the same time affections, both functional and local, in the pancreas, are sources of this distressing complaint. It is remarkable how little the disorders of this viscus are recognised; and yet it performs an important part in the phenomena of digestion. Several forms of pancreatic disease have come under my observation. The first symptoms have invariably been those of an indigestion, then local pain. These have increased to a distressing degree, with the pallor and the general symptoms of anæmia; but there was this difference from true stomach-disease, or from affections of the liver, that in all cases there was the absence of vomiting. In 1841, a case occurred in which

malignant disease had ulcerated into the stomach, and yet vomiting had not supervened; and in 1858, a case not altogether unlike it occurred; and at this present time one is running its painful and melancholy course beneath my observation.

HÆMATEMESIS is chiefly met with in connexion with ulceration of the stomach, but not always so. A case of some interest may be referred to, in which hæmorrhage to an enormous amount occasionally took place, usually as a vicarious menstruation. The blood voided never formed coagula. In one of these attacks the young person died. There was no trace of any abraded or inflamed surface in the stomach, nor any indication whence the blood had flowed.

Occasionally, in a hæmatemesis, the quantity of blood that passes into the intestines, and is there digested, becomes the source of much distress, and perhaps serious illness. I have seen prolonged fevers of a low and dangerous form from this source.

MELÆNA is an occasional affection of the district. Associated as it is with a gorged liver, it is generally relieved by evacuants, combined with styptics—as turpentine, tannic acid, or the matico. Acids combined with chloroform and bark have proved very useful when it has occurred in those advanced in years.

Of those rare affections, apparently very intimately connected with the dyspeptic state, in which a copious discharge of an oily fluid is passed from the bowels, mingled with the alvine excretions, a few cases have occurred. The matter referred to is like oil when passed, but quickly concretes into a solid, semi-transparent, waxy-looking mass; soft, yielding easily to the pressure of the finger, having, in fact, much the consistence of simple ointment; feculent in smell; apparently not changed by keeping; gives a greasy stain to paper, which is not discharged by heat; with litmus gives rather an alkaline reagency; on heat being applied, first liquefies, then passes off in white smoke, leaving a red viscid fluid; does not ignite on a lighted match being

applied to it, but the match burns brighter if moistened with it; with liquor potassæ forms a soapy, but not an homogeneous mass; not apparently acted on by nitric acid; sinks in alcohol, at the bottom of which, if heat be applied, a globule of amber yellow fluid forms; this, on cooling, again becomes solid, and to all appearance unaltered by the spirit, yet, if the supernatant alcohol be decanted and set aside, a slight opaque matter rises to the surface, and if water be added, the alcohol becomes opalescent, and deposits a white precipitate, which does not crystallize. We may therefore conclude that, though this matter in some of its relations approaches to fat, it cannot be considered identical with it. A lady, who occasionally passed this matter, used to call it "spermaeeti bile." She entertained the notion it was a form of bile.

Mr. Rogers, of Honiton, who is a good practical chemist, suggests, however, that it may be undigested fat. An analysis which he kindly made for me of two specimens, from different cases, of this discharge, is subjoined.*

SPLENITIS, and affections of the spleen generally, are very rare; cases sometimes are met with, chiefly under the Blackdown Hills, and in the valley of the Clyst. A case in which the

* *Analysis of Fatty Matters passed with the Excrement.*

No. 1 (collected on blotting paper) begins to melt at 95° F., and is perfectly fluid at 97° F.

No. 2 (in ointment box) softens at 96° F., fluid 98° F. It is partly soluble in spirits; the alcoholic solution yields no crystals of cetire (absence of spermaceti), it reacts strongly acid. It contains neither cholic nor paracholic acid. It is perfectly soluble in warm ether; the solution on cooling deposits small granular masses. It is not perfectly saponified with caustic potash. It contains nitrogen, but no trace of inorganic matter; on distillation it yields *acroleine*, this results from the decomposition of *glycerine*. The distilled product is boiled with water, and the cold aqueous solution gives a copious precipitate with nitrate of silver and acetate of lead, indicating the presence of *sebacic* acid, produced by the decomposition of *oleic* acid.

To another portion of the fat oxide of lead is added, and the resulting plaster treated with ether, and *oleate of lead* is dissolved out. The residue, insoluble in ether, consists of *stearate* and *margarate* of lead.

No. 1 and 2 correspond in every respect, with one exception, viz., the melting point of No. 1 being one or two degrees lower than that of No. 2. The former may contain more oleine than the latter. Is it not probable that they are both undigested fat?

J. R. R.

spleen was enormously enlarged occurred in Exeter some years ago. The swelling subsided, and the disease apparently had disappeared. Dying from other causes, a *post mortem* examination revealed the spleen absorbed into a small hard nodulated mass, not larger than an apple, in which, having passed into a dense fibrous structure, its normal structure was not recognisable.

DISEASES OF THE LIVER.—Bilious diarrhœa, and the slighter functional disorders of this viscus, are certainly not unfrequent; but what is generally understood by the term “liver disease” is by no means common. Occasionally cases of chronic affection, jaundice, &c., present themselves, but acute inflammation is very rare, as is also the formation of gall stones. In some cases of painful liver, simulating acute inflammation, and in which the urine remains scanty and highly lateritious, gout has evidently been the exciting cause. All pain is often relieved in these cases by a few doses of colicicum. Mercury does not appear to be beneficial, and may be positively injurious. An extreme case, illustrative of this, may be cited. In a gentleman aged 34 the liver continued tender, and the urine loaded with lithic acid. The use of mercury was continued, and apparently no specific action was induced, when it was discovered the periosteum of the lower limbs showed indications of painful swelling. Abscess in the bone tissue beneath, and spontaneous fracture of the bone, resulted.

JAUNDICE occurs under the usual circumstances, but more often from duodenitis than from any structural change in the liver itself, hence the treatment adapted to relieve the intestinal irritation is often the most efficacious, such as the application of blisters or other counter-irritants to the region of the pyloric end of the stomach, small doses of ipecacuanha, or the tartarized antimony with diluent diet; the subsequent remedy of the greatest use is the nitro-muriatic acid.

An incomplete form of jaundice, common to females, generally of a stout habit, about the change of life, is often met with.

The liver, though yielding bile to the intestines, is yet congested and swollen, and gives evidence of containing a superabundance, so that the complexion becomes of a dusky, may be of a leaden hue. The conjunctivæ are slightly yellowed; there are sudden flushes of heat, followed by faint fumes (sweats); the breathing is slightly hurried, with paroxysms of violent throbbing of the right heart. Though the appetite is good, there is a fluttering and agitation of the stomach after taking food. The urine is disposed to be turbid. This state of things is apt to last, more or less, for two or three years, and often with a very depressed state of the feelings. It is a critical state for the female, and, if not recovered from, is apt to set up visceral disease and dropsies. The general treatment requires aloetic purges, with a careful diet; the avoidance of stimulants, and of beer in particular. The nitro-muriatic acid is often useful. One case of this affection was associated with a fatty, or rather an oily liver. It was a case where the smallest quantity of mercury salivated.

GALL STONES are not a frequent complication of disease; when met with, they are usually associated with pyloric disease. In one such case a very large gall stone passed by ulceration into the intestine, where its presence induced a fatal obstruction. In another the gall stones were in little square masses, the bases being white, the corners black.

It may not be inapposite to mention a case which appears to me of much interest. A. B. had long been jaundiced; suffered pain on the right side on pressure, where was evidently a fulness and hardness. He occasionally experienced all the symptoms of the passing of gall stones, a few days after which, small dark-coloured matters, not unlike caraway seeds, were found mingled with the fæces. On the examination after death the gall-bladder was seen involved in a mass of scirrhus; the common biliary duct was scarcely pervious enough to admit an ordinary-sized pin; the liver itself was large and hard, gorged with bile, and here and there could be picked out the small caraway seed-looking particles. These are, without doubt, moulds of the separating surface of the liver, and apparently

consist of inspissated bile. They are evidently entitled to be called "calculi of the liver." They are about the tenth of an inch in length, and one-sixteenth in width, slightly curved and kidney-shaped, very light, ten weighing only one grain; their surfaces are covered over with ridge-like reticulations.* I am not aware that any such matters have been previously described.

Dropsy, as a result of liver disease, as also of pectoral obstructions, is not unusual. In these cases diuretics appear to have but little effect, unless they are combined with remedies to relieve the visceral congestions. Mercury, or small doses of elaterium, often give great relief.

DISEASES OF THE URINARY ORGANS are not very frequent, excepting towards the latter periods of life, when chronic diseases of the bladder, urethra, &c., are by no means uncommon. During the middle period of life the affections of the urinary system consist for the most part of inflammatory disorders of the kidney, giving rise to albuminous urine, and functional disease, characterized by an undue secretion of lithic acid, deposited in the form both of an amorphous sediment and gravel; this latter sometimes proves sufficiently obstinate and inconvenient in patients of lax fibre and broken-down constitution. The triple phosphate is also not an unusual deposit; but this is chiefly in those exhausting themselves by great mental or bodily labour. These cases are sometimes associated with a diuresis, sometimes with a distressing vomiting. This is invariably relieved by the nitro-muriatic acid.

NEPHRIA, or Bright's Disease, is far from infrequent, and presents in its history many phases. Besides the cases which occur after scarlet fever, there are those occurring from inflammatory attacks, and from obstructions in the circulating system from disease of the heart. The hereditary tendency to an albuminous urine has been strongly marked in some cases. In one case a father went through all the phases of Bright's

* These calculi were described and figured in the "Transactions of the Provincial Medical and Surgical Association," vol. xii. 1844.

disease, having first only complained of indigestion; his son complaining only of indigestion, has now shown symptoms of albuminuria. With care this disease is not only rendered tolerable to the constitution, and consistent with apparent health, but very confirmed cases are recovered from. A gentleman for upwards of thirty years has always passed a certain amount of albumen, and exhibits no great departure from robust health. In another, after taking a violent cold, there was albuminuria, followed by deposits in the pectoral cavities, and a general anasarca; he became the subject of fits and faintings at the heart. He partially recovered from some of the urgency of these symptoms, when a twelvemonth afterwards they recurred, and to a most formidable degree. Between three and four years such was his condition, with a densely coagulable urine, and yet perfect recovery has resulted. Digitalis and hydriodate of potash, with saline aperients, were of the greatest use in this case.

It is obvious from such cases as these that the conclusion of an albuminuria being always due to the anatomical state of kidney recognised as "Bright's kidney," must not be too exclusively arrived at.

DIABETES is not unfrequent in some localities, chiefly under the green sand hills. It occurs in males as a chronic disease much more frequently than in females, and for the most part terminates in a tubercular consumption. It is, however, difficult to determine in these cases that the diabetes is due primarily to a tubercular diathesis. It may be that the exhausting nature of the disease causes the system to be a fit depository of tubercle. Several of the cases that have occurred have been preceded by carbuncular eruptions, and some associated with affections of the brain. A heavy stout man was taken in the night season with a giddiness and general threatenings of an apoplexy; for twenty-four hours there was a diabetic urine, large in quantity, and containing sugar. This condition then entirely subsided; in another twenty-four hours he had an apoplectic attack, and died. Cases simulating fever, with

irritability of the stomach depending on affections of the brain, have shown this complication. It is probable in those anomalous cases of vomiting, which it is difficult to say whether they proceed from disorder of the stomach or of the brain, the presence of a saccharine urine would influence if not determine the diagnosis.

CALCULUS OF THE BLADDER is an affection comparatively rare. Many of the cases that do occur are of the mulberry, or oxalic acid base, but more have their origin in a nucleus of lithic acid, with layers of triple phosphate.

The amount of gravel voided occasionally by some persons, and even young children, is very remarkable; usually it is the lithic acid, occasionally in pisiform masses; not unfrequently it is associated with hæmorrhage from the kidney; and doubtless this is due to small sharp nodules being impacted in the kidney, and, on exertion, abrading its delicate structure.

A case in which calculi were apparently impacted in the right ureter occurred with the following symptoms:—J. B., aged fifty, stout and robust, passed half a pint of urine every four hours, high-coloured, turbid, and containing lithic acid, mucus, and colourless corpuscles, with some little albumen; was awakened up, four hours after going to bed, by severe pain in the region of the right kidney and ureter, which did not subside till the urine was voided; could lie on the right side but not on the left; occasionally passed a gravel of lithic acid; occasionally the urine was reported to have had the film indicative of the presence of a triple phosphate. This state had existed more or less for eighteen months, and he had been in the same state eight years previously. Above the crest of the right ilium two small swellings or nodules were to be felt: one the size of a bean, the other of a pea. They were evidently connected with the ureter, and to these spots were referred the pains and spasms. He took full amounts of opium for the spasms, but relief was ostensibly gained by the use of the decoction of pareira with the balsam of tolu. He ultimately recovered.

HÆMATURIA, from disease of the bladder, is now and then in

some isolated cases met with. The amount of blood and the size of the coagula voided are at times very remarkable. The most prompt and efficacious styptic is the spirit of turpentine, and the Chios turpentine has proved a convenient and most useful prophylactic against its recurrence.

INFLAMED PROSTATE in those advanced in years has many melancholy illustrations. It often creeps on insidiously, and the overflowings of a distended bladder are mistaken for a natural discharge of urine, so that unknown to the patient there is a bladder in a state of passive distension occupying a large space in the cavity of the abdomen. These cases seldom do well. They go through a period of painful instrumentation with but an unsatisfactory result. The history of two of these cases revealed what perhaps often occurs, that in early life spasmodic stricture of the urethra is mistaken for and pronounced to be membranous.

In one case, accompanied by the general symptoms of a restless hypochondriasis, there was evidently a passage from the rectum to the urethra. This gentleman often assured me that, after the bladder was emptied of its urine, wind was voided by the urethra. All doubt was set at rest by his producing the seeds of some strawberries he had eaten. No feculent matter ever passed, nor was the urine offensive, as if mixed with feces. The prostatic disease became eventually urgent, and he died in the greatest pain. On this occasion I witnessed the paroxysms of pain expressed by loud and bitter laughter.

IRRITABILITY OF THE BLADDER is, in its exaggerated forms, perhaps the most agonising disease to which frail mortality is subject. A gentleman advanced in life, every quarter of an hour was obliged to void his urine. No sedative could command repose from this distress; eventually, the evacuation of the urine could only be effected by the catheter, and four times in every hour did this gentleman pass the catheter. He could not submit to retain it in the urethra. In some young people, connected apparently with strumous disease, nearly the same

frequency has occurred. A girl, aged 13, was under my charge in the Devon and Exeter Hospital, in whom apparently no abnormal condition of the urine existed; every half hour the desire to pass water became imperative, and, if resisted, the pain and anxiety were beyond endurance. The medical treatment in these cases was most unsatisfactory; little or no benefit being derived from the use of such remedies as suggested themselves.

UTERINE DISEASES occur in a less proportion than in England generally. The months of April, May, June, July, and August, are those in which affections of this system occur the most frequently. They consist chiefly of chlorosis and amenorrhœa, and menorrhagia and fluor albus; these latter are chiefly prevalent about the age of thirty and upwards, while the former are more usually the disorders of twenty-five and under. Dysmenorrhœa is by no means infrequent, but is usually complicated with the others, though sometimes it appears as an idiopathic affection. Hysteritis is an occasional affection, generally relieved by calomel and opium. In some rare cases air has been secreted, and voided, freely by the uterus.

OVARIAN DISEASE is certainly somewhat common; very many cases present themselves as the year goes round. Sometimes an hereditary tendency determines them, it being not unusual to find a mother and daughter so afflicted.

Grounds exist for believing that there is an early stage of this affection in which considerable disturbance is occasionally set up in the constitution. I have seen two cases in which for years hysterical convulsions, combined with twisting spasms about the heart, existed; to subside as the ovarian tumours were developed. In one there was as it were an "aura" from the left ovary; in the other there had been no preceding indication of disease of the ovary till the swelling was manifest. I am not aware of any attempts having been made here for the extraction of the cysts.

CHRONIC ERUPTIVE DISEASES.—The chief varieties of these

affections that present themselves are eczema, herpetic eruptions, ecthyma and impetigo, psoriasis and pityriasis. Pemphigus is a rare disease, as is also ichthyosis and prurigo. Of all these affections, the most distressing and the least amenable to treatment is chronic pemphigus. Occurring for the most part in females, these cases appear to be mixed up with the hysterical constitution. Remedies rarely relieve; the debility associated with the disease indicates that tonics are required, but if administered the system is fevered. No depletion is suitable, nor are the usual alteratives of mercury, hydriodate of potash, &c. The persistency of this affection is remarkable, and though occasionally a case may be benefited by change of air, yet the disease soon recurs.

On reviewing the preceding account of the diseases of this district, partly derived from particular statistical records, but mainly from the personal experience of some years, it may be affirmed, as a general conclusion, that South Devon has no characteristic disease; that it is equally liable as other parts of England to the common forms of fever, but is very exempt from those of an intermittent type; that it is liable to the prevailing epidemics; that it is less liable to diseases of the lungs and to scrofula, more especially phthisis, than is the case in England generally.

CHAPTER VIII.

THE CLIMATE OF THE SOUTH OF DEVON CONSIDERED WITH REFERENCE TO ITS GENERAL EFFECTS IN HEALTH AND DISEASE.

IN the preceding chapters the climate and physical peculiarities of the south of Devon have been set forth, and some of their effects exemplified by a brief reference to the vegetable and animal productions, and to the diseases in man, occurring within its boundary. The more ordinary and general influence of its climate on the human animal economy may now, by way of conclusion, be considered.

In the summary of the climate given in a previous page (*vide antea*, p. 55,) it is stated that "its chief characteristics are those of being soft, warm, mild, calm, equable, and free from storms; moreover, it is essentially oceanic, as was to be expected from its latitude and position as regards the Atlantic." Visitors from colder climates are early sensible of some of its chief characteristics, more especially of that warm softness, which produces a general tendency to relaxation;* they will probably express themselves as labouring under an unusual lassitude of mind and body, a feeling of fatigue, and a greater inclination to sleep than usual; in fact, they actually require more repose: the functions of the skin become more active; the liver is disposed to secrete more freely; the discharge from the kidneys is rather lessened, as also the exhalation from the mucous surface of the lungs; and the respiration is diminished in frequency.

* The public singers who visit this district invariably complain of difficulty in producing the higher notes.

The ordinary physiological effects upon the constitution of a warm and moist climate show why benefit is likely to be derived from a change to the south of Devon in cases of disorder of the chest generally, but more especially in that irritable state of the lungs which precedes the development of consumption; in inflammatory bronchitic affections; in scrofula generally; as also in some forms of dyspepsia.

To all these disorders the climate of South Devon stands in opposition to that which is cold and moist, and which, designated by the common term of "raw," induces dyspeptic and pectoral difficulties.

To those who have lived for any considerable time in warmer latitudes, a residence in this district is serviceable, not only in a curative but prophylactic point of view. From the peculiar power of this climate to sustain free cutaneous perspiration, and from its not depressing the functions of the liver, it tends to prevent the disposition to general and local congestion, so much experienced by those returning from the warmer latitudes.

The diseased conditions to which it appears inapplicable are fulness of the head, any tendency to derangements of the great blood-vessels, a relaxed state of the uterine system, &c.

Mild and equable though the climate of South Devon has been shown to be, it has, in common with all temperate climates, its exceptional variations, and these frequently are very considerable. Strangers, who visit this district on the score of climate, often express surprise and disappointment on this account, and speak as if the mildness of the climate had been falsely stated. Doubtless the variations that do occur are very trying to the constitution, nevertheless they are not greater than are met with elsewhere in England. It is essentially a mild climate.

In the winter and early spring, amid fine open weather, cold and chilling winds often occur; these should be particularly guarded against, especially by the delicate in health, as they are apt, by unduly lowering the temperature of the surface, and repressing the cutaneous functions, to cause organic inflammations. A few bright sunny days in spring too frequently lure

the incautions to set aside their warm winter clothing, and the penalty often is, that colds and other ailments, slight or severe, are induced.

My own personal experience, irrespective of instrumental observation, induces me to state, as a practical conclusion, that in this district the warm clothing of winter should not be discarded, at the earliest, until the middle of May;* that by the middle, or, at the latest, by the latter end of September, it should be resumed; that it is only between these periods that out-door evening lounging can be enjoyed with impunity; that what may be called "summer" consists of the four months commencing about the middle of May,† and ending about the middle of September. Doubtless the October evenings are often fine and genial, but still the weather is uncertain and not to be relied on.

The disordered conditions of the animal economy in which a change to the climate of the south of Devon appears beneficial will now be more particularly referred to.

At certain periods of life the human system undergoes changes, which, though not actually referable to disease, are yet so weakening and depressing in their character, as to give cause for considerable anxiety: such as, in early youth, the weakness attendant upon a too rapid growth; that peculiar state about the conclusion of the middle period of life which has been termed climacteric disease; and the occasional failing in health of more advanced years. In these cases a change to this climate often appears to be highly advantageous, and to arrest their progress.

The symptoms of constitutional disorder attendant upon the specific state of weakness in early life are a pallid appearance, want of vigour of appetite, a thinning of the integument over

* The Scotch proverb runs, "Ne'er cast a clout till May be out."

† The half-hardy or budding-out plants cannot safely be planted out in the open air till the 20th of May; and the best date for hay harvest is about the 20th of June.

the chest, tongue slightly furred, increased action of the heart, sometimes slight pain about the cardiac region, pulse small and accelerated, together with a general tendency to febrile accessions. These cases frequently pass into a state bordering upon fever of a remittent type. There can be no doubt that an attention to this lesser state of derangement is of paramount importance, for, if neglected, it not unfrequently paves the way for the development of serious disease; scrofula, and the more obstinate forms of dyspepsia, often following in its wake.

The next period of life in which a change to this mild district appears particularly beneficial is that marked by the commencement of decay, to which the term "climacteric" has been applied. In a short, but very elegant essay, Sir Henry Hallford* views it as a disease rather than a mere declension of strength and natural decay of the bodily powers. It is particularly marked by an extraordinary alteration in the expression of the countenance, by a falling away of flesh, without any obvious source of exhaustion, and by a quicker pulse than natural. Sometimes it comes on so gradually and insensibly that the patient is hardly aware of its commencement. He perceives that he is sooner tired than usual, and that he is thinner than he was, but yet he has nothing material to complain of. In process of time the appetite becomes seriously impaired; the nights are sleepless, or, if he gets sleep, he is not refreshed by it; the face becomes visibly attenuated, or perhaps acquires a bloated look; the tongue is white, and he suspects that he has a fever. The period of the occurrence of this disorder is irregular, every age between fifty and seventy-five being liable to it.

In these cases a residence here is often early marked by the recovery of appetite and strength, and, to a certain extent, the regaining of flesh; and ere long an improvement in general appearance, and a restoration of constitutional power, prove that the system is surmounting its failing tendency.

* "Essays and Orations," p. 5.

In more advanced years the failing in health in which the climate of South Devon is often healing is that characterized by deficiency of appetite, with an imperfect assimilation of the food taken in,—it being apt to ferment, induce distressing flatulence, with general depression of the feelings. To this state of general debility there supervenes some anxiety about the heart, with occasional palpitations, a hurried breathing on the least exertion, or even at times spontaneously. The urinary organs show much irritability, and the fluid discharged is copious, very limpid, and disposed to be alkaline. This series of symptoms, especially those referred to the præcordia, indicate a cachectic state of the system, which, if not relieved, is almost certain early to degenerate into serious and fatal organic disease; but, if surmounted, as it often is, a prolonged period of vigorous old age may be the result.

SCROFULA.—Understanding by this term the existence of the deposit of tubercle in some one or other of the organs of the body, it becomes a matter of the greatest moment to counteract this tendency, or to control and remedy it when it has taken place. To those predisposed to its development this climate is eminently beneficial; it may therefore not be inappropriate to point out those states of the system which, indicating a tendency to it, are benefited by the mild air of South Devon.

The peculiar susceptibility to scrofula is often thought to belong exclusively to particular temperaments and complexions; such, however, does not appear to be the case; nevertheless, certain characteristics do exist, by which an inherent predisposition to the disease is indicated. As scrofula consists essentially in the formation and presence in the various tissues of tuberculous matter, it follows that any condition of the system which, under certain exciting causes, is prone to its development, may justly be termed a scrofulous diathesis. In describing briefly this condition, it is necessary to premise that its characters are progressive, and that they are ordinarily more pronounced if of hereditary origin than when acquired in after life.

The general form is frequently deficient in proportion and

symmetry, the abdomen prominent, the limbs small, with large rounded joints, and the head often relatively larger than the trunk. The skin, usually opaque, becomes sallow in the dark-complexioned, while in the fair it assumes an appearance not unlike blanchèd wax; to the feel it is soft and flaccid, and presents but little elastic resistance to the touch, giving the impression, when pinched, of being thinner than is usual in persons of a healthy constitution; it is indeed owing to its really being very thin in texture that the veins are seen ramifying beneath it; it rapidly shrinks away under privation, fatigue, or disease; but the effect of these being recovered from, its previous state of fulness is as quickly restored; this rapid shrinking away is owing to a deficiency in what is understood by the terms stamina, or enduring tone. When this constitution is more marked, the skin becomes coarse and dingy, generally dry and harsh (excepting in the palm of the hand, which is bedewed with an unhealthy cold moisture), and is occasionally very subject to various eruptions of a scaly or furfuraceous nature; the hair, especially in the morning, feels rough and dry, and looks as if undressed; the countenance is doughy; the cheeks are full and rounded; the upper lip and nose swollen; the eye large, with a very open pupil; the eyelashes, unless destroyed by conjunctival inflammation, long and handsome. The powers of the body are very inadequate to the apparent strength of the mould in which it is cast; the circulation is generally feeble, as is indicated by cold extremities and a weak pulse. This state of the circulating system forms an element in the tuberculous constitution;* it is rarely found wanting, and may be regarded as affording an explanation of many of the phenomena of the disease. The digestion is much enfeebled; the bowels become irregular, for the most part torpid, and the evacuations, especially in infancy, are not healthy; the urine is scanty, turbid, and ammoniacal; the cutaneous secretions are very irregular, sometimes suppressed, at other times excessive; their character is also diseased, being occasionally more or less fœtid, and usually leaving a reddish stain on linen, if worn many days. The

* "Clark on Consumption and Scrofula," p. 15.

nervous system is characterized by an exaggeration of its natural bias, the irritability or apathy of the constitution, as the case may be, becoming more marked. Protracted and frequent sleep is ordinarily much indulged in, and after slight exertion is profound in the extreme.

The climate of South Devon is particularly serviceable to persons of this constitution as a preventive of tubercular deposit; it is, however, rarely sought for until some disorder of the general health indicates that the first and incipient stage of the disease is confirmed, or is about to develop itself in its characteristic deposit. The consideration of this very important period has been much neglected; in its description should be included many symptoms which have hitherto been identified, though incorrectly, with the scrofulous diathesis.

The countenance, to the casual observer, presents the appearance of good health; a more accurate examination, however, betrays this appearance to be illusive: after very slight exertion it presents a haggard and worn expression, alike indicative of mental distress and bodily fatigue; and at times the cheeks assume a hectic flush, which adds to the brightness of an evidently excited eye. As this stage advances, the countenance loses its fallacious appearance, and assumes a hollow and jaded character. This is very marked if the complexion be sallow, the skin assuming a dull, untransparent, and doughy appearance, while the lips are pale. The last joint of the fingers now becomes swollen and rounded, instead of tapering; and the nails, squared and bent forwards, present that appearance which is termed "clubbed."

During this incipient stage of the disease there is great liability to colds and slight feverishness; the most trivial causes excite inflammatory action in the mucous membranes, during which all the other symptoms are aggravated. The patient complains of frequent faint perspirations, alternating with a dry, feverish state of the skin. The cold, clammy extremities are very liable to chilblains; the mucous membrane of the nose to inflammation, accompanied by a thin acrid sanguineous discharge, which excoriates the external surface; the swollen

alæ and septum, preventing the free passage of the air, oblige respiration in great measure to be carried on through the half-open mouth, which thus becomes a characteristic feature of the disease; the upper lip participates in the swelling, and now is seen the chap in the middle of it—a symptom of the disease itself, and not of the diathesis only, as is usually stated to be the case. The inner membrane of the eyelid is often irritable and inflamed, and, in this case, the eyelashes break off short, or are partially shed, so as to leave the eye unprotected. This stage, in short, presents all those appearances that might be expected in a subacute state of inflammation of the mucous membranes. On its accession there is, in those of a sanguineous temperament, an exaltation of the mental powers; the perceptions are quickened, and the expressions lively and brilliant; while in persons of a cold and phlegmatic constitution there is an increased dulness, and a more marked tendency to lethargy and inaction; the temper for the most part is placid, quiet, and relying, though sometimes, especially in those of a bilious temperament, desponding and perverse; the nervous system participates in the morbid changes, and exhibits more susceptibility than natural; the sleep is disturbed with dreams, and not unfrequently attended by weakening perspirations of an offensive character. The patient during this stage, though generally complaining and unwell, feels no one symptom of paramount importance, and scarcely knows how to describe his sensations.

Though to persons of this tubercular constitution, whether hereditarily or accidentally acquired, the climate of this portion of Devon almost invariably proves most beneficial, yet other points, and these are of universal application, should be attended to.

In a child born of strumous parents every means ought to be taken as regards food, air, clothing, &c., to strengthen the general health, and to counteract the hereditary tendency. During infancy, if the father alone be serofulous, and the mother in every way a proper person to nurse her own offspring, nourishment should by all means be derived from her, in preference to a stranger. If, however, the error of constitu-

tion be in the mother, a young healthy nurse should be substituted, and, for the first six or seven months, the infant entirely nourished from the milk so afforded; in the succeeding three or four months other food may be resorted to, in addition to that of the breast. A small quantity of the elouted cream, proper to this county, added to the boiled biseuit-powder, is very useful for this purpose; it forms a light and nutritious compound, and is often found to agree with delicate children when almost all other kinds of food prove to be inappropriate. About the age of ten months, or at least twelve, the infant should be weaned: nothing conduces so much to produce a feeble frame of body as protracting the period of nursing; the milk becoming poor and innutritious, and causing flatulence and indigestion.

As infants neither have the temperature of adult age, nor enjoy the power of generating heat to the same extent, their clothing is of the greatest importance. Cold operates much more generally than is supposed, and often seriously injures the constitution, even when its effects are not manifested by any present signs or immediate sensations. At the same time that it is necessary to watch the changes of the seasons, and to guard against their injurious effects, it is also of consequence to promote that state of the system which is favourable to the generation of animal heat, in order to compensate for the abstraction of it by radiation,—the temperature of our climate always making this a condition of existence. This is to be effected by maintaining the organs of respiration and circulation in a state of vigour, by exercise in the open air, living in well-ventilated apartments, and by keeping up a healthy condition of the surface of the body. The importance of fresh air cannot be too strongly inculcated; the rooms occupied by those of a strumous tendency should be large, airy, and not over-inhabited; and, above all things, the infant should not be confined in a cot or bed surrounded by curtains. The child of a country labourer, with everything against him, except that he enjoys fresh air, exhibits a vigour of health and appearance that is in vain looked for in those nurtured in the confined atmosphere of the nursery. The statistics of the south of Devon amply show this. Fresh

air gives tone to the skin, vigour to the respiration, and conduces in great measure to a healthy state of the digestive organs.

As the infant advances to childhood, the same general rules are to be followed. New faculties, however, come into play, whose progress should be watched with the most zealous care. The development of the mind requires an anxious careful watching and management. Nothing can be more injurious than the forced system of education which prevails in the present day; the head is developed at the expense of the body; and a child thus brought up presents the appearance of a weakly frame with a precocious intellect, which, as manhood advances, fades into weakness and irresolution. A child having a scrofulous diathesis should learn many of its lessons in the fields, and not be bound down to books in the crowded atmosphere of a school-room. Amongst boys there is some relief and antidote in the hours of exercise, and free enjoyment both of body and mind; the whole period, however, of female school education is too generally fraught with conditions the most injurious to the strumous constitution; their rooms, frequently confined for space and ill-ventilated, are too often overcrowded; the use of stays, bands, and strings prevents the free exercise of the muscles; in school and out of school it is one system of drilling and exhausting attention, either to mental or external qualifications; and the natural positions of the body, which are occasionally assumed to relieve the consequent fatigue, are reproved as unseemly and unlady-like; then again the course of study is so copious and extensive that the energies of the mind are weakened by a succession of ever-varying impressions.

Another point to be particularly attended to is the state of the moral feelings. Should they be naturally excitable, control must be exercised, but of that quiet and unsuspecting kind not calculated to irritate or wound; on the other hand, if they be of a morose or apathetic nature, means should be taken to induce cheerfulness and activity. Children at an early age are much more susceptible of moral impressions, which may influence the action of after years, than is generally supposed.

CONSUMPTION.—This district possesses many of the qualifications which are usually thought requisite for counteracting the consumptive tendency, such as its contiguity to the sea—its protective amphitheatre of hills forming an adequate barrier against the north and east winds—together with an atmosphere soft, warm, and charged with aqueous vapour: a condition eminently useful towards alleviating irritation of the lungs. The spring, from the occasional prevalence of easterly winds, is the only season which is trying to the consumptive constitution; nevertheless, it may be that, even then, this district is more suitable than most other parts of England.

In order to estimate the probable benefit to be derived from a change to this climate, its effect in different stages of this disease may be specified.

1st. Before and at the commencement of the deposit of tubercle in the lung.

2nd. During the conversion of the tubercle into yellow matter, but anterior to the

3rd stage, when softening of the tubercle and suppuration have taken place.

In general terms it may be stated that, in the first stage, a removal to climates of this mild character often proves curative; that, in the second, the disease may not only be retarded, but frequently the health become so far re-established as to prevent the further development of tubercle; in the third and last stage its utility is very equivocal, unless the disease assume a chronic form; then, to a certain extent, it certainly is serviceable.

The condition of the system preceding tubercular development in the lung has been minutely described by Sir James Clark, who terms it the tubercular cachexy. In speaking of scrofula, its chief characteristics have been mentioned: we shall therefore proceed briefly to notice that period of the disease in which tubercle, though it may have been deposited, is yet unaccompanied by any very active tendency. From a careful examination of a large number of cases, this stage appears to be characterized by a slight febrile action; great disposition to perspirations on the slightest exertion, and in bed; general

feeling of weakness and exhaustion; small and quick pulse; anxious and easily excited manner; occasional cough, which is dry, or nearly so, and sometimes so slight as scarcely to arouse the patient's attention; from this cough being accompanied by some slight symptoms of indigestion, and by no very prominently-marked chest affection, it is often unfortunately attributed to mere disorder of the stomach, and upon this presumption the danger consequent upon its continuance is disregarded; there is also a gradual loss of weight; stitch is frequently felt in the side, as well as fleeting pains in the integuments, not unlike those of rheumatism; sometimes a constant pain is referred to the centre and lower portion of the sternum; the breathing is usually short and hurried, and a general tendency to bronchitic attacks is evinced. On further investigation it is frequently found that a small quantity of blood, a mere speck or streak, is expectorated with the mucus—a seemingly unimportant symptom, but which should always be viewed with the most anxious alarm. The *stethoscopic* signs are a general sound pervading the chest, resembling, to a certain extent, the noise heard on putting a small shell to the ear; (this confused sound takes the place of the vesicular murmur, and is probably due to a state of hyperæmia, causing greater resonance in the bronchial tubes, so that the inspiratory murmur is prolonged into, and confounded with, the expiratory, which is itself increased in intensity;) distinct sonorous bronchial respiration during and after cough, giving the idea of the chest opening widely; a dry ronehus towards the apex of the chest, if tubercle have formed even in the smallest quantity; the voice sounding deep and dull, reverberating immediately beneath the stethoscope, but not so strongly as to be called a bronchophony. On percussion the sound is not strikingly affected, though sometimes accurate examination may detect a slight dulness, as well as some diminution in the freedom of motion under one or both clavicles: so frequently has this state of things been observed, not only in those most certainly predisposed to tubercular development, but where it has been followed by the disease itself, that it must be viewed as the

early but *curable* stage of consumption, and consequently well worthy of every attention.

In this stage of the disease the effects of the climate of South Devon on those coming from less temperate districts are often very marked; the general tendency to weakness and irritability of the system is quickly subdued, the pulse becomes less frequent, and this general amelioration of the symptoms appears followed by a complete restoration to health. The medical treatment usually pursued at the same time has been such as would give tone and strength while subduing irritation. The free use of external rubefacients to the chest is also most useful. Under modifications of this treatment it is remarkable how quickly the pulse is brought down, *without* being depressed, the patient at the same time gaining rapidly in flesh and weight.

When the disease has fully arrived at its second stage, cure is, I believe, entirely out of the question; nevertheless, the symptoms may be alleviated, the disease kept in abeyance, and life prolonged. By a residence in this climate the pulse certainly becomes stronger and less quick, the expectoration lessened, the evening fever and its subsequent night perspiration diminished, and the patient, to a certain extent, recovers his former strength.

In the third stage, when the disease has become fully confirmed, and there is every evidence of the tissue of the lung being seriously and *actively* affected, any view of ultimate recovery is utterly hopeless. Unless there be some peculiar and obvious necessity, a removal is not only fatiguing and injurious to the patient, but delusive to the hopes of the friends. It is from such injudicious practice that discredit has been thrown upon the really useful and curative effects of this climate, when applied in proper time.

Occasionally, however, consumption assumes, even after suppuration has taken place, somewhat of a chronic form, probably owing to a small portion of the lung only being affected; this is usually in persons about or past the meridian of life. They invariably suffer from cold or bracing climates, and may therefore pass their time more comfortably to themselves in this district.

BRONCHITIC AFFECTIONS.—Nearly all the diseases which affect the mucous membrane of the trachea, and bronchial tubes generally, are benefited by soft, mild weather; it is therefore no more than might be anticipated to find the climate of South Devon serviceable to them. This is particularly the case in the common bronchitis, which constitutes the great amount of winter cough suffered from in this country.

Bronchitis when thus assuming a chronic form, becomes peculiarly distressing. The prominent symptom, in the young and middle-aged, is a frequent cough, which, if not accompanied by copious expectoration of a mucous or muco-puriform character, is attended by urgent febrile derangement, and painful constriction of the chest. Under the more favourable circumstances the pulse is somewhat frequent, and the tongue slightly swollen and furred, indicating a small amount of fever; but when the cough is troublesome, pain in the head, as likewise in the bowels, is often superinduced, and, at times, if the expectoration be morbidly checked, and assume a viscid pituitous character, the breathing is rendered difficult, and, in the reclining posture, almost impossible, while the mind is oppressed with a feeling that, unless quickly relieved, life cannot be sustained. In old persons it assumes a somewhat different character; the expectoration is profuse and constant, the pulse feeble and languid, the bodily and sometimes mental powers are characterized by extreme debility, and the disposition to sleep is often so strong as to give an impression of moroseness. In these chronic forms of bronchitis this climate appears very beneficial, relief being afforded in the older and more confirmed cases, and cure in those of earlier life.

It will also be found useful in many cases of asthma, and in those little, short, irritating coughs which are dependent upon a subacute inflammation of the larynx. Of course, while speaking of these different diseases, it is not to be supposed that change of climate will alone effect all things; the patient must give every assistance, by the exercise of the extreme caution, and the medical attendant by those remedial means which present

symptoms may require. To enlarge upon these would obviously be out of place. It may, however, be observed, that nothing is more requisite than for the invalid to take precautions against the dampness of the ground so frequent here, to avoid exposure to the coldness of the night air, as also when the air during the day feels raw and chilling. A damp state of the atmosphere, provided the temperature, and stillness of the air give to it a sensation of warmth, is not injurious.

DYSPEPSIA.—Sir James Clark* is particularly impressive in recommending change to the South of Devon in the inflammatory or gastritic form of dyspepsia. Its symptoms are general uneasiness over the region of the stomach, together with a sensation which is understood by the term, “anxiety about the præordia;” occasional heart-burn, and rising into the mouth of a small quantity of aerid fluid; the action of the heart is varied,—sometimes it is increased, and distressing palpitations alarm the patient, at other times it is slow and weak, accompanied by a sensation of sinking and oppression; thirst is frequent; the appetite capricious; the gums sometimes red and swollen; the tongue florid at the side and tip, coated in the centre, with elevated papillæ; the eye slightly suffused; the skin now harsh and dry, then covered with a cold, clammy moisture, often a symptom dwelt on by the dyspeptic; the urine participates in this variableness, at one time being clear and pale, at another loaded, and early depositing large quantities of ammoniacal sediment. As these symptoms increase, the mind evidently becomes affected; attention is concentrated with difficulty, unless it be upon the exaggerated view the patient takes of his own malady; memory becomes impaired, and sleep, often banished from the pillow, oppresses unbidden when in the sitting posture. At times a more nervous state is superinduced; the pulse becomes small and quick, the head aches, the bowels are confined, flatulence and borborygma increase to a distressing extent, the limbs shake, the whole nervous system appears

* “On Climate,” p. 22.

upset, and the patient becomes overwhelmed with apprehensions of impending ruin.

A residence in this climate is particularly advantageous in these forms of the disease, causing general amelioration of the symptoms ; nor is it less useful, from its power of equalizing and maintaining cutaneous perspirations in dyspepsia depending upon a morbid action of the secreting surfaces : not so, however, when this affection is associated with, or mainly depends upon general debility ; these cases require a more bracing air.

Somewhat connected with the subject of dyspepsia, it may be observed that a constitutional tendency to gout is considerably checked, and the health, in confirmed and chronic cases, often materially improved by a residence here. The same may be said of rheumatic affections. In dysentery it appears particularly serviceable, especially when occurring in the chronic forms, so common in persons returning from hot climates. Cutaneous affections, especially those of a scaly character, are much ameliorated by it.

In some of the derangements peculiar to females the Devonshire climate is beneficial ; in others it is too relaxing. It is more particularly useful in that form of amenorrhœa characterized by the bloodless cheek and lip, shortness of breath, nervous palpitation of the heart, quick, small pulse, pain referred to a spot beneath the left breast, and general tendency to constipation. It is also useful when the periodical accession is preceded or accompanied by excessive local pain.

In the above remarks the influence of the general climate of the South of Devon only has been referred to. In preceding chapters it has been, however, shown, that from the differing elevation, aspect, and soil of some of its localities, this general climate is much modified. In selecting a situation on the score of health all this must be considered, so that the requirements of each individual case may, as far as possible, be fulfilled.

INDEX.

	PAGE		PAGE
Alcoholism	217	Catarrhal peripneumonia	246
Amphibia	135	Cetacea	132
Amusements	155	Catalepsy	237
Angina maligna.....	187	Caverns, bone, in lime rocks	73
Apoplexy	228	Chalk	89
Apples.....	139	Chicken-pox	180
Asiatic cholera	206	Cholera, Asiatic.....	206
Asthma	246	Chorea.....	229
—— effect of climate on.....	276	Chudleigh	111
Babbicombe	117	Cider	151
Barometer, mean reading of	23	Clay, porcelain	140
—— highest and lowest for		Claystone trap rocks.....	66
forty years	24	Climacteric diseases, climate in ...	265
Barometric curves, chart of.....	27	Climate of South Devon	1—60
Barometer, range of	28	—— summary of	54
Bed sores	223	—— compared	57
Beer and Seaton	129	—— with that of London	58
Birds, migratory	134	—— changes of, considered.....	264
Births	165	—— effect of, in health and	
Bladder, calculus of	259	disease	263
—— irritability of	260	Cloud	36
Botany	137	—— table of	36
Bovey coal	90	Coal, borings for	147
Bovey, South	111	Coal, Bovey	90
Brain and nerves, diseases of	226	Colic, lead	250
Branscombe	128	Conglomerate, Exeter	80
Brixham	113	Consumption	224
Bronchocele	216	—— influence of climate in	273
Bronchitis, effect of climate in ...	276	Cow and bull, Devon	130
Budleigh-Salterton	125	Cream	154
Bull and cow, Devon	130	Croup	188
Canal, Exeter.....	148	Dartmouth	113
—— Stover	149	Dawlish	121
—— Tiverton and Western	149	Deaths.....	166
Cancrum oris	222	Delirium tremens	230
Carbonaceous rocks	75	Devonian rocks	70

	PAGE		PAGE
Dewpoint	31	Greensand formation	88
—— average temperature of,		Hæmorrhage	242
table.....	32	Hæmatemesis.....	253
Diabetes	258	Hæmaturia	259
Diarrhœa	205	Hail	52
Diet	151	Health, influenced by season	124
Digestive organs, diseases of	247	Heart, diseases of	241
Diphtheria	188	Heavitree	108
Disease, type of.....	173	—— quarry.....	83
Diseases, table of	176	Heights of hills	105
Dropsy	220	Horse, pack	132
Dysentery	204	Horticulture	138
Dyspepsia	251	Houses.....	146
—— climate in	277	Hydrocephalus	227
Empyema	244	Hydrology of South Devon.....	94
Enteritis	250	Hydrophobia	212
Epidemics, historical (<i>note</i>)	168	Hysteria	237
—— recent.....	170	Ichthyology	135
Epilepsy	236	Ide	108
Eruptions	261	Influenza.....	199
Erysipelas	197	Insanity	231
Exe river, frozen	14	Intermittent fever.....	208
—— floods of.....	102	Jaundice	255
Exeter	99	Lace, manufacture of	144
—— levels of.....	105	Laryngismus stridulus	241
—— water supply of	103	Laryngitis	243
—— water-works	149	Latitude and longitude.....	5
Exmouth.....	122	Laver	155
Fever	189	Lead colic	250
—— relapsing	192	Leprosy	211
—— remittent	208	Levels of hills	105
—— intermittent	208	Lightning and thunder	52
Fish	135	Lignite	90
Fogs and mists	38	Limestone, Devonian	72
Fright	235	—— carbonaceous.....	76
Frost	14	Liver, diseases of	255
Fuel.....	148	Lupus	222
Furunculus	199	Lustleigh.....	111
Gall stones	256	Lympstone	109
Gastritis	249	Mania	231
Geology of South Devon.....	61	—— puerperal	234
Glossitis	247	Marriages	162
Goodrington	114	Mammalia	130
Gout	219	Measles	181
—— climate in	278	Melanosis	222
Granite	61	McLeena	253
—— boundaries of	64	Metria	198
Grauwacke	70	Mists and fogs	38
Gravels	93	Moor towns	110
Greenstone trap rock	65	Morcton	110

	PAGE		PAGE
Mortification	223	Scrofula	224
Natural productions of South		—— climate in	267
Devon	130	—— symptoms of.....	268
Necusia	213	Seurvy.....	213
Nephria	257	Seaton	129
Neuralgia	241	Schistose, carbonaceous rocks ...	78
New red sandstone	80	Scirrhus	221
Œsophagitis	248	Season, influence on health of ...	174
Œsophagus, stricture of	248	Sexes, proportion of	162
Ornithology	133	Sheep	131
Ovarian disease	261	Sidmouth	127
Ozone	54	Slates, Devonian	71
Pack-horse	132	Small-pox	176
Paignton.....	114	Snow	50
Pancreas, disease of	252	—— storm (<i>note</i>)	50
Paralysis	229	South Bovey	111
Parasitici	218	South Devon, area of	157
Pears	140	—— atmospheric pressure in ..	25
Peripneumonia notha	246	—— boundaries of	94
—— catarrhal.....	246	—— climate of	1—60
Peritonitis	249	—— diseases of.....	168
Physiognomy of South Devon ...	2	—— general position of ...	1
Pig	131	—— geology and hydrology ..	61
Plants, acclimatized	141	—— latitude and longitude ..	5
Pleurisy	244	—— natural productions of ..	130
Pneumonia	245	—— population	158
Ponies	132	—— temperature of	5
Population	158	—— vital statistics of	157
Potteries	144	Spinal irritation.....	238
Prostate gland, inflamed	260	Splenitis	254
Puerperal mania	224	Springs	95
Purpura	215	Starcross	109
Rain	39	Stomach, diseases of.....	248
—— annual average	40	Stomatitis	247
—— drizzling	45	Storms.....	20
—— various tables of	39—49	—— chart of	21
Railroads	149	Swine-pox	180
Relapsing fever	192	Teignmouth	118
Remittent fever.....	208	Temperature, annual average	3
Respiratory organs, diseases of ...	243	—— calculated (<i>note</i>) ...	3
Rheumatism	209	—— mean monthly	5
Roads	147	—— tables of.....	5, 6
—— rail	149	—— diurnal	8
Saint Leonard	108	—— in the sun	11
Saint Thomas.....	108	—— range of ..	13
Salcombe.....	112	—— extremes of	16
Salterton, Budleigh	125	Tetanus	240
Sandstone, new red	80	Thermometer, wet bulb	34
—— green	88	—— table	35
Scarlet fever	183	Thunder and lightning	52

	PAGE		PAGE
Thunder and lightning, storms of	53	Watershed	94
Topsham	109	Waters of the granite	95
Torquay	114	——— trap formation	95
——— water-works	151	——— Devonian series	96
Towns of South Devon.....	99	——— carbonaceous series	96
Trap rocks	65	Water supply.....	149
Trismus	240	Whetstones.....	145
Type of disease	173	Whooping-cough	188
Upton and West Hill	110	Wild mammals	132
Urinary organs, diseases of.....	257	Wind	16
Uterus, diseases of	261	—— annual and monthly tables of	17
——— effect of climate	279	—— associated temperature of ...	18
Vaccination	179	—— storms of	20
Valleys	94	Woodbury	112
Vital statistics	157	Woollen manufacture	143

NEW WORKS
PUBLISHED BY MR. CHURCHILL.

BY
THOMAS SHAPTER, M.D., F.R.C.P.

THE CLIMATE OF THE SOUTH OF DEVON,
AND
ITS INFLUENCE UPON HEALTH;

WITH SHORT ACCOUNTS OF EXETER, TORQUAY, BABBICOMBE, TEIGNMOUTH,
DAWLISH, EXMOUTH, BUDLEIGH-SALTERTON, SIDMOUTH, ETC.

Second Edition.

NOTICES OF THE FIRST EDITION.

“This very admirable work, for completeness, information, and philosophical tone, may serve as a model for all future inquiries of the same nature.”—*British and Foreign Medical Review*.

“We recommend this work to those interested in the subject of climate, as one which will give them valuable information on this important subject.”—*The London and Edinburgh Monthly Journal of Medical Science*.

“The climate is very minutely described, and its effect on health and disease very clearly discussed.”—*The Monthly Magazine*.

“We have derived much pleasure from the perusal of Dr. Shapter’s work, and the profession will find it, we have no doubt, as useful as we declare it pleasant to read.”—*Medical Times*.

“This volume is far more than a guide book. It contains much statistical information, with very minute local details, that may be advantageously consulted by the medical man before he recommends any specific residence in Devonshire to his patient.”—*Athenæum*.

“The remarks upon the principal inland and sea-coast towns of South Devon are what will render the book most interesting to the general reader; and being backed, as previously said, by an admitted medical authority, it should become the companion of all who are seeking health in these renowned regions of our own fair isle. The geology, natural productions, economical history and statistics of South Devon are also treated of; and thus, while there is a philosophy in the relation of all these subjects to one another, there is also a source of instructive amusement to all who follow our advice, and make this their guide to South Devon.”—*Literary Gazette*.

BY THE SAME AUTHOR.

THE

HISTORY OF THE CHOLERA IN EXETER IN 1832.

WITH MAP AND ILLUSTRATIONS.

8vo, cloth, price 12s.

“The interest which belongs to this work is by no means of a local character. It is the history of this fatal disease in every town in the United Kingdom at that period. Dr. Shapter’s views on the nature and character of the disease are correct, clear, practical, and equally applicable to our present visitation as to that to which they more particularly belong.”—*Lancet*.

“This treatise contains a mass of trustworthy and well-arranged statistics, much sound reasoning upon what has been described, and all so skilfully concocted that the general reader will relish this work quite as well as the physician.”—*Monthly Journal of Medical Science*.

SANITARY MEASURES, AND THEIR RESULTS;

BEING A SEQUEL TO THE

“HISTORY OF THE CHOLERA IN EXETER IN 1832.”

“Dr. Shapter, encouraged, we suppose, by the success of his ‘History of the Cholera in Exeter in 1832,’ has written a sequel to that work under the title of ‘Sanitary Measures and their Results.’ This work should be read by every man who professes to be doubtful of the value of sanitary precautions in the face of such a terrible disease as that here described; there could hardly be a more forcible illustration of the truths of sanitary science than it affords.”—*Athenæum*.

MEDICINE AN ART, AND ITS TRUTHS TO BE ATTAINED.

BEING AN

ADDRESS READ ON JANUARY 31, 1848,

At the Opening Meeting of the Library of the Exeter Dispensary, and the Devon and Exeter Pathological Society.

“We cordially thank Dr. Shapter for the assistance he has given us, and of which we have gladly and freely availed ourselves in setting before the medical profession the imperfections of its present intellectual system.”—*British and Foreign Medico-Chirurgical Review*.

London, New Burlington Street,
May, 1869.

MESSRS. CHURCHILL & SONS'

Publications,

IN

M E D I C I N E

AND THE VARIOUS BRANCHES OF

NATURAL SCIENCE.



"It would be unjust to conclude this notice without saying a few words in favour of Mr. Churchill, from whom the profession is receiving, it may be truly said, the most beautiful series of Illustrated Medical Works which has ever been published."—*Lancet*.

"All the publications of Mr. Churchill are prepared with so much taste and neatness, that it is superfluous to speak of them in terms of commendation."—*Edinburgh Medical and Surgical Journal*.

"No one is more distinguished for the elegance and *recherché* style of his publications than Mr. Churchill."—*Provincial Medical Journal*.

"The name of Churchill has long been a guarantee for the excellence of illustrated works, and it would be superfluous to repeat the admiration that we have several times expressed in this respect, of the spirit with which this firm engages in these costly but valuable series."—*Medical Press and Circular*.

"The typography, illustrations, and getting up are, in all Mr. Churchill's publications, most beautiful."—*Monthly Journal of Medical Science*.

"Mr. Churchill's illustrated works are among the best that emanate from the Medical Press."—*Medical Times*.

"We have before called the attention of both students and practitioners to the great advantage which Mr. Churchill has conferred on the profession, in the issue, at such a moderate cost, of works so highly creditable in point of artistic execution and scientific merit."—*Dublin Quarterly Journal*.

MESSRS. CHURCHILL & SONS are the Publishers of the following Periodicals, offering to Authors a wide extent of Literary Announcement, and a Medium of Advertisement, addressed to all Classes of the Profession.

THE BRITISH AND FOREIGN MEDICO-
CHIRURGICAL REVIEW,
AND
QUARTERLY JOURNAL OF PRACTICAL MEDICINE
AND SURGERY.

Price Six Shillings. Nos. I. to LXXXVI.

THE QUARTERLY JOURNAL OF
MICROSCOPICAL SCIENCE,
Edited by DR. LANKESTER, F.R.S., and E. RAY
LANKESTER, B.A., F.R.M.S. Price 4s.
Nos. I. to XXXIV. *New Series.*

THE JOURNAL OF MENTAL SCIENCE.

By authority of the Medico-Psychological
Association.
Edited by C. L. ROBERTSON, M.D., and HENRY
MAUDSLEY, M.D.
Published Quarterly, price 3s. 6d. *New Series.*
Nos. I. to XXXIII.

JOURNAL OF CUTANEOUS MEDICINE.

Edited by ERASMUS WILSON, F.R.S.
Published Quarterly, price 2s. 6d. Nos. I. to IX.

ARCHIVES OF MEDICINE :

A Record of Practical Observations and Anato-
mical and Chemical Researches, connected
with the Investigation and Treatment of
Disease. Edited by Dr. LIONEL S. BEALE,
F.R.S. Published Quarterly; Nos. I. to VIII.,
3s. 6d.; IX. to XII., 2s. 6d., XIII. to XVI., 3s.

THE ROYAL LONDON OPHTHALMIC HOSPITAL
REPORTS, AND JOURNAL OF OPHTHALMIC
MEDICINE AND SURGERY.

Vol. VI., Part 3, 2s. 6d.

THE MEDICAL TIMES & GAZETTE.

Published Weekly, price Sixpence, or Stamped,
Sevenpence.

Annual Subscription, £1. 6s., or Stamped,
£1. 10s. 4d., and regularly forwarded to all
parts of the Kingdom.

THE PHARMACEUTICAL JOURNAL,
CONTAINING THE TRANSACTIONS OF THE PHAR-
MACEUTICAL SOCIETY.

Published Monthly, price One Shilling.

* * * Vols. I. to XXVII., bound in cloth, price
12s. 6d. each.

THE BRITISH JOURNAL OF DENTAL
SCIENCE.

Published Monthly, price One Shilling. Nos.
I. to CL.

THE MEDICAL DIRECTORY.

Published Annually. 8vo. cloth, 10s. 6d.

THE HALF-YEARLY ABSTRACT OF THE MEDICAL SCIENCES.
BEING A DIGEST OF BRITISH AND CONTINENTAL MEDICINE,
AND OF THE PROGRESS OF MEDICINE AND THE COLLATERAL SCIENCES.

Post 8vo. cloth, 6s. 6d. Vols. I. to XLVIII.

"American physicians may be congratulated that they are once more favoured with the reprint of 'Ranking's Abstract.' If any doctor is so busy that he can read but a single volume a year, then, assuredly, he should make this his book; for here are collected and condensed the most valuable contributions to periodical medical literature—French, German, British, and American—for the year; and, on the other hand, no physician—it matters not how wide the range of his reading—can fail to find, in this volume, truths that will enlarge his medical knowledge, and precepts that will help him in some of his daily professional needs."—*Cincinnati Journal of Medicine*, April, 1867.

"We have only space to say that this volume is rich in valuable articles, among which there are many on *materia medica* and therapeutics. Gathered from all sources in the new books and medical journals of Europe and America, this work may be viewed as the cream of that class of medical essays, and is a useful occupant of the physician's office-table, to keep him reminded of the progress of medicine."
—*American Journal of Pharmacy*, May, 1867.

A CLASSIFIED INDEX

TO

MESSRS. CHURCHILL & SONS' CATALOGUE.

ANATOMY.

	PAGE
Anatomical Remembrancer ..	7
Flowor on Nerves	16
Healo's Anatomy of the Lungs ..	19
Heath's Practical Anatomy ..	20
Holden's Human Osteology ..	20
Do. on Dissections	20
Jones' and Sieveking's Patho- logical Anatomy	22
MacDougal—Hirschfeld on the Nervous System	V
MacLise's Surgical Anatomy ..	25
St. Bartholomew's Hospital Catalogue	31
Sibson's Medical Anatomy ..	33
Waters' Anatomy of Lung ..	37
Wheeler's Anatomy for Artists ..	38
Wilson's Anatomy	39

CHEMISTRY.

Bernays' Notes for Students ..	9
Bloxam's Chemistry	10
Do. Laboratory Teaching ..	10
Bowman's Practical Chemistry ..	10
Do. Medical do.	10
Fownes' Manual of Chemistry ..	16
Do. Actonian Prize	16
Do. Qualitative Analysis ..	16
Fresenius' Chemical Analysis ..	17
Galloway's First Step	17
Do. Second Step	17
Do. Analysis	17
Do. Tables	17
Griffiths' Four Seasons	18
Horsley's Chem. Philosophy ..	21
Mulder on the Chemistry of Wine ..	27
Plattner & Muspratt on Blowpipe ..	28
Shuttleworth's Modern Chemistry ..	32
Speer's Pathol. Chemistry ..	34
Sutton's Volumetric Analysis ..	34

CLIMATE.

Bennet's Winter in the South of ..	9
Europe	
Chambers on Italy	12
Dalrymple on Egypt	14
Francis on Change of Climate ..	16
Hall on Torquay	19
Haviland on Climate	19
Horton on West Coast of Africa ..	21
Lee on Climate	24
Do. Watering Places of England ..	24
McClelland on Bengal	25
McNicol on Southport	25
Martin on Tropical Climates ..	26
Moore's Diseases of India	26
Patterson's Egypt and the Nile ..	28
Scoresby-Jackson's Climatology ..	32
Shapter on South Devon	32
Siordet on Mentone	33
Taylor on Pau and Pyrenees ..	35
Williams on South of France ..	38

DEFORMITIES, &c.

	PAGE
Adams on Spinal Curvature ..	6
Do. on Clubfoot	6
Bigg's Orthopraxy	9
Bishop on Deformities	10
Do. Articulate Sounds	10
Brodhurst on Spine	11
Do. on Clubfoot	11
Godfrey on Spine	17
Hugman on Hip Joint	21
Salt on Lower Extremities ..	31
Tamplin on Spine	35

DISEASES OF WOMEN AND CHILDREN.

Ballard on Infants and Mothers ..	7
Bennet on Uterus	9
Eyre's Practical Remarks	15
Harrison on Children	19
Hood on Scarlet Fever, &c. ..	21
Kiwisch (ed. by Clay) on Ovaries ..	15
Lee's Ovarian & Uterine Diseases ..	24
Do. on Speculum	24
Ritchie on Ovaries	31
Seymour on Ovaria	32
Tilt on Uterine Inflammation ..	36
Do. Uterine Therapeutics ..	36
Do. on Change of Life	36
Underwood on Children	36
Wells on the Ovaries	38
West on Women	38
Do. (Uvedale) on Puerp. Diseases ..	38
Wright on Uterine Disorders ..	39

GENERATIVE ORGANS, Diseases of, and SYPHILIS.

Acton on Reproductive Organs ..	6
Coote on Syphilis	14
Gant on Bladder	17
Hutchinson on Inherited Syphilis ..	22
Lee on Syphilis	23
Oppert on Syphilis	27
Parker on Syphilis	27
Wilson on Syphilis	39

HYGIENE.

Armstrong on Naval Hygiene ..	7
Beale's Laws of Health	8
Carter on Training	12
Chavasso's Advice to a Mother ..	13
Do. Advice to a Wife	13
Dobell's Germs and Vestiges of Disease	15
Fife & Urquhart on Turkish Bath ..	16
Gordon on Army Hygiene	17
Granville on Vichy	18
Hartwig on Sea Bathing	19

HYGIENE—continued.

	PAGE
Hartwig on Physical Education ..	19
Hufeland's Art of prolonging Life ..	21
Hunter on Body and Mind ..	21
Lee's Baths of France, Germany, and Switzerland	24
Lowndes on the Maintenance of Health	25
Moore's Health in Tropics	26
Parkes on Hygiene	28
Parkin on Disease	28
Pearse's Notes on Health	28
Pickford on Hygiene	28
Robertson on Diet	31
Routh on Infant Feeding	31
Wells' Seamen's Medicine Chest ..	38
Wilson on Healthy Skin	39
Do. on Mineral Waters	39
Do. on Turkish Bath	39

MATERIA MEDICA and PHARMACY.

Beasley's Formulary	9
Do. Receipt Book	9
Do. Book of Prescriptions ..	9
Birch on Oxygen	9
Brunton on Digitalis	11
Flux on Sale of Poisons	16
Frazier's Materia Medica	16
Nevins' Analysis of Pharmacop. ..	27
Percira's Selecta & Præscriptis ..	28
Prescriber's Pharmacopœia	29
Royle's Materia Medica	31
Squire's Hospital Pharmacopœias ..	34
Do. Companion to the Phar- macopœia	34
Steggall's First Lines for Chemo- mists and Druggists	34
Stowe's Toxicological Chart	34
Taylor on Poisons	35
Wahlstuch's Materia Medica ..	37
Waring's Therapeutics	37
Wittstein's Pharmacy	39

MEDICINE.

Adams on Rheumatic Gout	6
Addison on Cell Therapeutics ..	6
Do. on Healthy and Dis- eased Structure	6
Aldis's Hospital Practice	6
Anderson (Andrew) on Fever ..	7
Austin on Paralysis	7
Barclay on Medical Diagnosis ..	8
Do. on Gout	8
Barlow's Practice of Medicine ..	8
Baslam on Dropsy	8
Braidwood on Pyæmia	10
Brinton on Stomach	11
Do. on Intestinal Obstruction ..	11
Budd on the Liver	11

MEDICINE—continued.

	PAGE
Budd on Stomach	11
Campbell on Diabetes	12
Catlow on Æsthetic Medicine ..	12
Chambers on the Indigestions ..	12
Do. Lectures	12
Cockle on Cancer	13
Dalo's Practical Medicine	14
Davey's Ganglionic Nervous Syst.	15
Day's Clinical Histories	15
Eyre on Stomach	15
Fenwick on the Stomach	16
Fuller on Rheumatism	16
Gairdner on Gout	17
Gibb on Throat	17
Do. on Laryngoscopy	17
Granville on Sudden Death	18
Griffith on the Skin	18
Gully's Simple Treatment	18
Habershon on the Abdomen	18
Do. on Mercury	18
Hall (Marshall) on Apnoea	18
Do. Observations	18
Headland—Action of Medicines ..	19
Do. Medical Handbook	19
Hooper's Physician's Vade-Mecum ..	18
Inman's New Theory	22
Do. Myalgia	22
James on Laryngoscopy	22
Jencken on Cholera	22
Jones (Bence) on Pathology and Therapeutics	22
MacLachlan on Advanced Life	25
MacLeod on Aeholic Diseases	25
MacLeod's Ben Rhidding	25
Mareet on Chronic Alcoholism	25
Macpherson on Cholera	26
Markham on Bleeding	26
Morris on Germinal Matter	27
Meryon on Paralysis	26
Mushet on Apoplexy	27
Nicholson on Yellow Fever	27
Parkin on Cholera	28
Pavy on Diabetes	28
Do. on Digestion	28
Roberts on Palsy	31
Robertson on Gout	31
Sansom on Cholera	32
Savory's Domestic Medicine	32
Semple on Cough	32
Seymour on Dropsy	32
Shaw's Medical Remembrancer	32
Shrimpton on Cholera	32
Smee on Debility	33
Steggall's Medical Manual	34
Thomas' Practice of Physic	35
Thudichum on Gall Stones	35
Todd's Clinical Lectures	36
Tweedie on Continued Fevers	36
Walker on Diphtheria	37
What to Observe at the Bedside ..	25
Williams' Principles	38
Wright on Headaches	39

MICROSCOPE.

Beale on Microscope in Medicine ..	8
Carpenter on Microscope	12
Schacht on do.	32

MISCELLANEOUS.

Acton on Prostitution	6
Barelay's Medical Errors	8
Bascome on Epidemics	8

MISCELLANEOUS—cont'd.

	PAGE
Buckle's Hospital Statistics	11
Cooley's Cyclopaedia	13
Edwards' Photographs	15
Gordon on China	17
Graves' Physiology and Medicine ..	17
Gny's Hospital Reports	17
Harrison on Lead in Water	19
Hingeston's Topics of the Day	20
Howe on Epidemics	21
Lane's Hydropathy	23
Lee on Homœop. and Hydrop	24
London Hospital Reports	24
Mayne's Medical Vocabulary	26
Opport on Hospitals	27
Part's Case Book	28
Redwood's Supplement to Pharmacopœia	30
Ryan on Infanticide	31
St. George's Hospital Reports	31
Simms' Winter in Paris	33
Snow on Chloroform	33
Waring's Tropical Resident at Home	37
Whitehead on Transmission	38
Wise's Med. amongst Asiatics	38

NERVOUS DISORDERS AND INDIGESTION.

Althaus on Epilepsy, Hysteria, &c. ..	7
Birch on Constipation	9
Carter on Hysteria	12
Downing on Neuralgia	15
Hunt on Heartburn	21
Jones (Handfield) on Functional Nervous Disorders	22
Leared on Imperfect Digestion	23
Lobb on Nervous Affections	24
Morris on Irritability	26
Reade on Syphilitic Affections of the Nervous System	30
Reynolds on the Brain	30
Do. on Epilepsy	30
Rowe on Nervous Diseases	31
Sieveling on Epilepsy	33
Turnbull on Stomach	36

OBSTETRICS.

Hodges on Puerperal Convulsions ..	20
Lee's Clinical Midwifery	24
Do. Consultations	24
Leishman's Mechanism of Parturition	24
Pretty's Aids during Labour	29
Priestley on Gravid Uterus	30
Ramsbotham's Obstetrics	30
Sinclair & Johnston's Midwifery ..	33
Smellie's Obstetric Plates	33
Smith's Manual of Obstetrics	33
Swayne's Aphorisms	34
Waller's Midwifery	37

OPHTHALMOLOGY.

Cooper on Injuries of Eye	13
Do. on Near Sight	13
Dalrymple on Eye	14
Dixon on the Eye	15
Hogg on Ophthalmoscope	20

OPHTHALMOLOGY—cont'd.

	PAGE
Hulke on the Ophthalmoscope	21
Jago on Entoptics	22
Jones' Ophthalmic Medicine	23
Do. Defects of Sight	23
Do. Eye and Ear	23
Macnamara on the Eye	25
Nunneley on the Organs of Vision ..	27
Power's Illustrations of Diseases of the Eye	29
Solomon on Glaucoma	33
Walton on the Eye	37
Wells Treatise on the Eye	38
Do. on Spectacles	38
Wolfe on Cataract	39

PHYSIOLOGY.

Carpenter's Human	12
Do. Manual	12
Heale on Vital Causes	19
Richardson on Coagulation	30
Shea's Animal Physiology	32
Virehow's (ed. by Chance) Cellular Pathology	12

PSYCHOLOGY.

Arlidge on the State of Lunacy	7
Bucknill and Tuke's Psychological Medicine	11
Davey on Nature of Insanity	15
Dunn on Psychology	15
Hood on Criminal Lunatics	21
Millingen on Treatment of Insane ..	26
Murray on Emotional Diseases	27
Noble on Mind	27
Sankey on Mental Diseases	31
Winslow's Obscure Dis. of Brain ..	39

PULMONARY and CHEST DISEASES, &c.

Allison on Pulmonary Consumption ..	6
Bright on the Chest	10
Cotton on Stethoscope	14
Davies on Lungs and Heart	14
Debell on the Chest	15
Do. on Tuberculosis	15
Do. on Winter Cough	15
Do. First Stage of Consumption	15
Fuller on the Lungs	16
Do. on Heart	16
Jones (Jas.) on Consumption	23
Laennec on Auscultation	23
Markham on Heart	26
Peacock on the Heart	28
Pirie on Hay Asthma	29
Salter on Asthma	31
Skoda on Auscultation	26
Thompson on Consumption	35
Timms on Consumption	36
Turnbull on Consumption	36
Waters on the Chest	37
Do. on Emphysema	37

**RENAL and URINARY
DISEASES.**

	PAGE
Acton on Urinary Organs ..	6
Beale on Kidney Diseases ..	8
Bird's Urinary Deposits ..	10
Coulson on Bladder ..	14
Hassall on Urino ..	19
Parkes on Urine ..	28
Thudichum on Urino ..	35
Todd on Urinary Organs ..	36

SCIENCE.

Baxter on Organic Polarity ..	8
Bentley's Manual of Botany ..	9
Brooke's Natural Philosophy ..	11
Craig on Electric Tension ..	14
Hardwich's Photography ..	19
Hinds' Harmonics ..	20
Howard on the Clouds ..	21
Huxley on Classification of Animals ..	22
Jones (Bence) on Matter and Force ..	22
Jones (Wharton) on Vision ..	23
Do. on Body, Sense, and Mind ..	23
Mayne's Lexicon of Terms ..	26
Noad on the Inductivium ..	27
Pratt's Genealogy of Creation ..	29
Do. Eccentric & Centric Force ..	29
Do. on Orbital Motion ..	29
Do. Astronomical Investigations ..	29
Do. Oracles of God ..	29
Price's Photography ..	30
Rainey on Shells ..	30
Reymond's Animal Electricity ..	30
Taylor's Medical Jurisprudence ..	35
Vestiges of Creation ..	36

SURGERY.

	PAGE
Adams on Reparation of Tendons ..	6
Do. Subcutaneous Surgery ..	6
Anderson on the Skin ..	7
Ashton on Rectum ..	7
Brodhurst on Anchylosis ..	11
Bryant on Diseases of Joints ..	11
Do. Clinical Surgery ..	11
Callender on Rupture ..	12
Chapman on Ulcers ..	12
Do. Varicose Veins ..	12
Clark's Outlines of Surgery ..	13
Collis on Cancer ..	13
Cooper (Sir A.) on Testis ..	13
Do. (S.) Surg. Dictionary ..	14
Coulson on Stone in Bladder ..	14
Curling on Rectum ..	14
Do. on Testis ..	14
Druitt's Surgeon's Vade-Mecum ..	15
Fayrer's Clinical Surgery ..	15
Ferguson's Surgery ..	16
Do. Progress of Surgery ..	16
Gamgee's Amputation at Hip-joint ..	17
Gant's Principles of Surgery ..	17
Gay on Varicose Disease ..	17
Heath's Minor Surgery and Bandaging ..	20
Do. on the Jaws ..	20
Higginbottom on Nitrate of Silver ..	20
Hodgson on Prostate ..	20
Holt on Stricture ..	21
Lawrence's Surgery ..	23
Do. Ruptures ..	23
Lee on the Rectum, &c. ..	23
Liston's Surgery ..	24
Logan on Skin Diseases ..	24
Macleod's Surgical Diagnosis ..	25
Macleod's Surgery of the Crimea ..	25
Macleod on Fractures ..	25

SURGERY—continued.

	PAGE
Marsden on Cancer ..	26
Mannder's Operative Surgery ..	26
Naylor on Skin Diseases ..	27
Nunneley on Erysipelas ..	27
Pirrie's Surgery ..	29
Plirrie & Keith on Acupressure ..	29
Price on Excision of Knee-joint ..	29
Ramsay and Coles on Deformi- ties of the Mouth ..	30
Sansom on Chloroform ..	32
Smith (Hy.) on Stricture ..	33
Do. on Hæmorrhoids ..	33
Do. on the Surgery of the Rectum ..	33
Do. (Dr. J.) Dental Anatomy and Surgery ..	33
Spender on Ulcers ..	34
Squire on Skin Diseases ..	34
Steggall's Surgical Manual ..	34
Teale on Amputation ..	35
Thompson on Stricture ..	35
Do. on Prostate ..	35
Do. Lithotomy and Lithotripsy ..	35
Do. on Urinary Organs ..	35
Tomes' Dental Surgery ..	36
Wade on Stricture ..	37
Webb's Surgeon's Ready Rules ..	37
Wilson on Skin Diseases ..	39
Do. Portraits of Skin Diseases ..	39
Yearsley on Deafness ..	39
Do. on Throat ..	39

VETERINARY MEDICINE.

Blaine's Veterinary Art ..	10
Bourguignon on the Cattle Plague ..	10

TO BE COMPLETED IN TWELVE PARTS, 4to., AT 7s. 6d. PER PART.

PARTS I. & II. NOW READY.

A DESCRIPTIVE TREATISE ON THE NERVOUS SYSTEM OF MAN,

WITH THE MANNER OF DISSECTING IT.

By LUDOVIC HIRSCHFELD,

DOCTOR OF MEDICINE OF THE UNIVERSITIES OF PARIS AND WARSAW, PROFESSOR OF ANATOMY TO THE
FACULTY OF MEDICINE OF WARSAW;

Edited in English (from the French Edition of 1866)

By ALEXANDER MASON MACDOUGAL, F.R.C.S.,

WITH

AN ATLAS OF ARTISTICALLY-COLOURED ILLUSTRATIONS,

Embracing the Anatomy of the entire Cerebro-Spinal and Sympathetic Nervous Centres and Distribu-
tions in their accurate relations with all the important Constituent Parts of the Human Economy,
and embodied in a series of 56 Single and 9 Double Plates, comprising 197 Illustrations,

Designed from Dissections prepared by the Author, and Drawn on Stone by

J. B. LÉVEILLÉ.

MR. ACTON, M.R.C.S.

I.

A PRACTICAL TREATISE ON DISEASES OF THE URINARY AND GENERATIVE ORGANS IN BOTH SEXES. Third Edition. 8vo. cloth, £1. 1s. With Plates, £1. 11s. 6d. The Plates alone, limp cloth, 10s. 6d.

II.

THE FUNCTIONS AND DISORDERS OF THE REPRODUCTIVE ORGANS IN CHILDHOOD, YOUTH, ADULT AGE, AND ADVANCED LIFE, considered in their Physiological, Social, and Moral Relations. Fourth Edition. 8vo. cloth, 10s. 6d.

III.

PROSTITUTION: Considered in its Moral, Social, and Sanitary Bearings, with a View to its Amelioration and Regulation. 8vo. cloth, 10s. 6d.

DR. ADAMS, A.M.

A TREATISE ON RHEUMATIC GOUT; OR, CHRONIC RHEUMATIC ARTHRITIS. 8vo. cloth, with a Quarto Atlas of Plates, 21s.

MR. WILLIAM ADAMS, F.R.C.S.

I.

ON THE PATHOLOGY AND TREATMENT OF LATERAL AND OTHER FORMS OF CURVATURE OF THE SPINE. With Plates. 8vo. cloth, 10s. 6d.

II.

CLUBFOOT: its Causes, Pathology, and Treatment. Jacksonian Prize Essay for 1864. With 100 Engravings. 8vo. cloth, 12s.

III.

ON THE REPARATIVE PROCESS IN HUMAN TENDONS AFTER SUBCUTANEOUS DIVISION FOR THE CURE OF DEFORMITIES. With Plates. 8vo. cloth, 6s.

IV.

SKETCH OF THE PRINCIPLES AND PRACTICE OF SUBCUTANEOUS SURGERY. 8vo. cloth, 2s. 6d.

DR. WILLIAM ADDISON, F.R.S.

I.

CELL THERAPEUTICS. 8vo. cloth, 4s.

II.

ON HEALTHY AND DISEASED STRUCTURE, AND THE TRUE PRINCIPLES OF TREATMENT FOR THE CURE OF DISEASE, ESPECIALLY CONSUMPTION AND SCROFULA, founded on MICROSCOPICAL ANALYSIS. 8vo. cloth, 12s.

DR. ALDIS:

AN INTRODUCTION TO HOSPITAL PRACTICE IN VARIOUS COMPLAINTS; with Remarks on their Pathology and Treatment. 8vo. cloth, 5s. 6d.

DR. SOMERVILLE SCOTT ALISON, M.D. EDIN., F.R.C.P.

THE PHYSICAL EXAMINATION OF THE CHEST IN PULMONARY CONSUMPTION, AND ITS INTERCURRENT DISEASES. With Engravings. 8vo. cloth, 12s.

DR. ALTHAUS, M.D., M.R.C.P.

ON EPILEPSY, HYSTERIA, AND ATAXY. Cr. 8vo. cloth, 4s.

THE ANATOMICAL REMEMBRANCER; OR, COMPLETE
POCKET ANATOMIST. Sixth Edition, carefully Revised. 32mo. cloth, 3s. 6d.

DR. MCCALL ANDERSON, M.D.

I.
THE PARASITIC AFFECTIONS OF THE SKIN. Second
Edition. With Engravings. 8vo. cloth, 7s. 6d.

II.
ECZEMA. Second Edition. 8vo. cloth, 6s.

III.
PSORIASIS AND LEPRA. With Chromo-lithograph. 8vo. cloth, 5s.

DR. ANDREW ANDERSON, M.D.

TEN LECTURES INTRODUCTORY TO THE STUDY OF FEVER.
Post 8vo. cloth, 5s.

DR. ARLIDGE.

ON THE STATE OF LUNACY AND THE LEGAL PROVISION
FOR THE INSANE; with Observations on the Construction and Organisation of
Asylums. 8vo. cloth, 7s.

DR. ALEXANDER ARMSTRONG, R.N.

OBSERVATIONS ON NAVAL HYGIENE AND SCURVY.
More particularly as the latter appeared during a Polar Voyage. 8vo. cloth, 5s.

MR. T. J. ASHTON.

I.
ON THE DISEASES, INJURIES, AND MALFORMATIONS
OF THE RECTUM AND ANUS. Fourth Edition. 8vo. cloth, 8s.

II.
PROLAPSUS, FISTULA IN ANO, AND HÆMORRHOIDAL
AFFECTIONS; their Pathology and Treatment. Second Edition. Post 8vo. cloth 2s. 6d.

MR. THOS. J. AUSTIN, M.R.C.S.ENG.

A PRACTICAL ACCOUNT OF GENERAL PARALYSIS:
Its Mental and Physical Symptoms, Statistics, Causes, Scat, and Treatment. 8vo. cloth, 6s.

DR. THOMAS BALLARD, M.D.

A NEW AND RATIONAL EXPLANATION OF THE DIS-
EASES PECULIAR TO INFANTS AND MOTHERS; with obvious Suggestions
for their Prevention and Cure. Post 8vo. cloth, 4s. 6d.

DR. BARCLAY.

I.

A MANUAL OF MEDICAL DIAGNOSIS. Second Edition.
Foolscap 8vo. cloth, 8s. 6d.

II.

MEDICAL ERRORS.—Fallacies connected with the Application of the
Inductive Method of Reasoning to the Science of Medicine. Post 8vo. cloth, 5s.

III.

GOUT AND RHEUMATISM IN RELATION TO DISEASE
OF THE HEART. Post 8vo. cloth, 5s.

DR. BARLOW.

A MANUAL OF THE PRACTICE OF MEDICINE. Second
Edition. Fcap. 8vo. cloth, 12s. 6d.

DR. BASCOME.

A HISTORY OF EPIDEMIC PESTILENCES, FROM THE
EARLIEST AGES. 8vo. cloth, 8s.

DR. BASHAM.

ON DROPSY, AND ITS CONNECTION WITH DISEASES OF
THE KIDNEYS, HEART, LUNGS AND LIVER. With 16 Plates. Third
Edition. 8vo. cloth, 12s. 6d.

MR. H. F. BAXTER, M.R.C.S.L.

ON ORGANIC POLARITY; showing a Connexion to exist between
Organic Forces and Ordinary Polar Forces. Crown 8vo. cloth, 5s.

MR. LIONEL J. BEALE, M.R.C.S.

THE LAWS OF HEALTH IN THEIR RELATIONS TO MIND
AND BODY. A Series of Letters from an Old Practitioner to a Patient. Post 8vo.
cloth, 7s. 6d.

DR. BEALE, F.R.S.

I.

ON KIDNEY DISEASES, URINARY DEPOSITS, AND
CALCULOUS DISORDERS. Third Edition, much Enlarged. With 70 Plates.
8vo. cloth, 25s.

II.

THE MICROSCOPE, IN ITS APPLICATION TO PRACTICAL
MEDICINE. Third Edition. With 58 Plates. 8vo. cloth, 16s.

MR. BEASLEY.

I.
THE BOOK OF PRESCRIPTIONS; containing 3000 Prescriptions.
 Collected from the Practice of the most eminent Physicians and Surgeons, English and Foreign. Third Edition. 18mo. cloth, 6s.

II.
THE DRUGGIST'S GENERAL RECEIPT-BOOK; comprising a copious Veterinary Formulary and Table of Veterinary Materia Medica; Patent and Proprietary Medicines, Druggists' Nostrums, &c.; Perfumery, Skin Cosmetics, Hair Cosmetics, and Teeth Cosmetics; Beverages, Dietetic Articles, and Condiments; Trade Chemicals, Miscellaneous Preparations and Compounds used in the Arts, &c.; with useful Memoranda and Tables. Sixth Edition. 18mo. cloth, 6s.

III.
THE POCKET FORMULARY AND SYNOPSIS OF THE BRITISH AND FOREIGN PHARMACOPŒIAS; comprising standard and approved Formulæ for the Preparations and Compounds employed in Medical Practice. Eighth Edition, corrected and enlarged. 18mo. cloth, 6s.

DR. HENRY BENNET.

I.
A PRACTICAL TREATISE ON INFLAMMATION AND OTHER DISEASES OF THE UTERUS. Fourth Edition, revised, with Additions. 8vo. cloth, 16s.

II.
A REVIEW OF THE PRESENT STATE (1856) OF UTERINE PATHOLOGY. 8vo. cloth, 4s.

III.
WINTER IN THE SOUTH OF EUROPE; OR, MENTONE, THE RIVIERA, CORSICA, SICILY, AND BIARRITZ, AS WINTER CLIMATES. Third Edition, with numerous Plates, Maps, and Wood Engravings. Post 8vo. cloth, 10s. 6d.

PROFESSOR BENTLEY, F.L.S.

A MANUAL OF BOTANY. With nearly 1,200 Engravings on Wood. Fcap. 8vo. cloth, 12s. 6d.

DR. BERNAYS.

NOTES FOR STUDENTS IN CHEMISTRY; being a Syllabus compiled from the Manuals of Miller, Fownes, Berzelius, Gerhardt, Gorup-Besanez, &c. Fourth Edition. Fcap. 8vo. cloth, 3s.

MR. HENRY HEATHER BIGG.

ORTHOPRAXY: the Mechanical Treatment of Deformities, Debilities, and Deficiencies of the Human Frame. With Engravings. Post 8vo. cloth, 10s.

DR. S. B. BIRCH, M.D., M.R.C.P.

I.
OXYGEN: ITS ACTION, USE, AND VALUE IN THE TREATMENT OF VARIOUS DISEASES OTHERWISE INCURABLE OR VERY INTRACTABLE. Second Edition. Post 8vo. cloth, 3s. 6d.

II.
CONSTIPATED BOWELS: the Various Causes and the Different Means of Cure. Third Edition. Post 8vo. cloth, 3s. 6d.

DR. GOLDING BIRD, F.R.S.

URINARY DEPOSITS; THEIR DIAGNOSIS, PATHOLOGY,
AND THERAPEUTICAL INDICATIONS. With Engravings. Fifth Edition.
Edited by E. LLOYD BIRKETT, M.D. Post 8vo. cloth, 10s. 6d.

MR. BISHOP, F.R.S.

I.
ON DEFORMITIES OF THE HUMAN BODY, their Pathology
and Treatment. With Engravings on Wood. 8vo. cloth, 10s.

II.
ON ARTICULATE SOUNDS, AND ON THE CAUSES AND
CURE OF IMPEDIMENTS OF SPEECH. 8vo. cloth, 4s.

MR. BLAINE.

OUTLINES OF THE VETERINARY ART; OR, A TREATISE
ON THE ANATOMY, PHYSIOLOGY, AND DISEASES OF THE HORSE,
NEAT CATTLE, AND SHEEP. Seventh Edition. By Charles Steel, M.R.C.V.S.L.
With Plates. 8vo. cloth, 18s.

MR. BLOXAM.

I.
CHEMISTRY, INORGANIC AND ORGANIC; with Experiments
and a Comparison of Equivalent and Molecular Formulæ. With 276 Engravings on Wood.
8vo. cloth, 16s.

II.
LABORATORY TEACHING; OR PROGRESSIVE EXERCISES
IN PRACTICAL CHEMISTRY. With 89 Engravings. Crown, 8vo. cloth, 5s. 6d.

DR. BOURGUIGNON.

ON THE CATTLE PLAGUE; OR, CONTAGIOUS TYPHUS IN
HORNED CATTLE: its History, Origin, Description, and Treatment. Post 8vo. 5s.

MR. JOHN E. BOWMAN, & MR. C. L. BLOXAM.

I.
PRACTICAL CHEMISTRY, including Analysis. With numerous Illus-
trations on Wood. Fifth Edition. Foolscep 8vo. cloth, 6s. 6d.

II.
MEDICAL CHEMISTRY; with Illustrations on Wood. Fourth Edition,
carefully revised. Fcap. 8vo. cloth, 6s. 6d.

DR. BRAIDWOOD, M.D. EDIN.

ON PYÆMIA, OR SUPPURATIVE FEVER: the Astley Cooper
Prize Essay for 1868. With 12 Plates. 8vo. cloth, 10s. 6d.

DR. JAMES BRIGHT.

ON DISEASES OF THE HEART, LUNGS, & AIR PASSAGES;
with a Review of the several Climates recommended in these Affections. Third Edi-
tion. Post 8vo. cloth, 9s.

DR. BRINTON, F.R.S.

I.

THE DISEASES OF THE STOMACH, with an Introduction on its Anatomy and Physiology; being Lectures delivered at St. Thomas's Hospital. Second Edition. 8vo. cloth, 10s. 6d.

II.

INTESTINAL OBSTRUCTION. Edited by DR. BUZZARD. Post 8vo. cloth, 5s.

MR. BERNARD E. BRODHURST, F.R.C.S.

I.

CURVATURES OF THE SPINE: their Causes, Symptoms, Pathology, and Treatment. Second Edition. Roy. 8vo. cloth, with Engravings, 7s. 6d.

II.

ON THE NATURE AND TREATMENT OF CLUBFOOT AND ANALOGOUS DISTORTIONS involving the TIBIO-TARSAL ARTICULATION. With Engravings on Wood. 8vo. cloth, 4s. 6d.

III.

PRACTICAL OBSERVATIONS ON THE DISEASES OF THE JOINTS INVOLVING ANCHYLOSIS, and on the TREATMENT for the RESTORATION of MOTION. Third Edition, much enlarged, 8vo. cloth, 4s. 6d.

MR BROOKE, M.A., M.B., F.R.S.

ELEMENTS OF NATURAL PHILOSOPHY. Based on the Work of the late Dr. Golding Bird. Sixth Edition. With 700 Engravings. Fcap. 8vo. cloth, 12s. 6d.

DR. T. L. BRUNTON, B.Sc., M.B.

ON DIGITALIS. With some Observations on the Urine. Fcap. 8vo. cloth, 4s. 6d.

MR. THOMAS BRYANT, F.R.C.S.

I.

ON THE DISEASES AND INJURIES OF THE JOINTS. CLINICAL AND PATHOLOGICAL OBSERVATIONS. Post 8vo. cloth, 7s. 6d.

II.

CLINICAL SURGERY. Parts I. to VII. 8vo., 3s. 6d. each.

DR. BUCKLE, M.D., L.R.C.P. LOND.

VITAL AND ECONOMICAL STATISTICS OF THE HOSPITALS, INFIRMARIES, &c., OF ENGLAND AND WALES. Royal 8vo. 5s.

DR. JOHN CHARLES BUCKNILL, F.R.S., & DR. DANIEL H. TUKE.

A MANUAL OF PSYCHOLOGICAL MEDICINE: containing the History, Nosology, Description, Statistics, Diagnosis, Pathology, and Treatment of Insanity. Second Edition. 8vo. cloth, 15s.

DR. BUDD, F.R.S.

I.

ON DISEASES OF THE LIVER.

Illustrated with Coloured Plates and Engravings on Wood. Third Edition. 8vo. cloth, 16s.

II.

ON THE ORGANIC DISEASES AND FUNCTIONAL DISORDERS OF THE STOMACH. 8vo. cloth, 9s.

MR. CALLENDER, F.R.C.S.

FEMORAL RUPTURE: Anatomy of the Parts concerned. With Plates.
8vo. cloth, 4s.

DR. JOHN M. CAMPLIN, F.L.S.

ON DIABETES, AND ITS SUCCESSFUL TREATMENT.
Third Edition, by Dr. Glover. Fcap. 8vo. cloth, 3s. 6d.

MR. ROBERT B. CARTER, M.R.C.S.

ON THE INFLUENCE OF EDUCATION AND TRAINING
IN PREVENTING DISEASES OF THE NERVOUS SYSTEM. Fcap. 8vo., 6s.
THE PATHOLOGY AND TREATMENT OF HYSTERIA. Post
8vo. cloth, 4s. 6d.

DR. CARPENTER, F.R.S.

PRINCIPLES OF HUMAN PHYSIOLOGY. With nearly 300 Illustrations on Steel and Wood. Seventh Edition. Edited by Mr. HENRY POWER. 8vo. cloth, 28s.

A MANUAL OF PHYSIOLOGY. With 252 Illustrations on Steel and Wood. Fourth Edition. Fcap. 8vo. cloth, 12s. 6d.

THE MICROSCOPE AND ITS REVELATIONS. With more than 400 Engravings on Steel and Wood. Fourth Edition. Fcap. 8vo. cloth, 12s. 6d.

MR. JOSEPH PEEL CATLOW, M.R.C.S.

ON THE PRINCIPLES OF ÆSTHETIC MEDICINE; or the Natural Use of Sensation and Desire in the Maintenance of Health and the Treatment of Disease. 8vo. cloth, 9s.

DR. CHAMBERS.

LECTURES, CHIEFLY CLINICAL. Fourth Edition. 8vo. cloth, 14s.

THE INDIGESTIONS OR DISEASES OF THE DIGESTIVE ORGANS FUNCTIONALLY TREATED. Second Edition. 8vo. cloth, 10s. 6d.

SOME OF THE EFFECTS OF THE CLIMATE OF ITALY.
Crown 8vo. cloth, 4s. 6d.

DR. CHANCE, M.B.

VIRCHOW'S CELLULAR PATHOLOGY, AS BASED UPON PHYSIOLOGICAL AND PATHOLOGICAL HISTOLOGY. With 144 Engravings on Wood. 8vo. cloth, 16s.

MR. H. T. CHAPMAN, F.R.C.S.

THE TREATMENT OF OBSTINATE ULCERS AND CUTANEOUS ERUPTIONS OF THE LEG WITHOUT CONFINEMENT. Third Edition. Post 8vo. cloth, 3s. 6d.

VARICOSE VEINS: their Nature, Consequences, and Treatment, Palliative and Curative. Second Edition. Post 8vo. cloth, 3s. 6d.

MR. PYE HENRY CHAVASSE, F.R.C.S.

I.
ADVICE TO A MOTHER ON THE MANAGEMENT OF
HER CHILDREN. Ninth Edition. Foolscape 3vo., 2s. 6d.

II.
ADVICE TO A WIFE ON THE MANAGEMENT OF HER
OWN HEALTH. With an Introductory Chapter, especially addressed to a Young
Wife. Eighth Edition. Fcap. 8vo., 2s. 6d.

MR. LE GROS CLARK, F.R.C.S.

OUTLINES OF SURGERY; being an Epitome of the Lectures on the
Principles and the Practice of Surgery delivered at St. Thomas's Hospital. Fcap. 8vo.
cloth, 5s.

MR. JOHN CLAY, M.R.C.S.

KIWISCH ON DISEASES OF THE OVARIES: Translated, by
permission, from the last German Edition of his Clinical Lectures on the Special Patho-
logy and Treatment of the Diseases of Women. With Notes, and an Appendix on the
Operation of Ovariectomy. Royal 12mo. cloth, 16s.

DR. COCKLE, M.D.

ON INTRA-THORACIC CANCER. 8vo. 6s. 6d.

MR. COLLIS, M.B.DUB., F.R.C.S.I.

THE DIAGNOSIS AND TREATMENT OF CANCER AND
THE TUMOURS ANALOGOUS TO IT. With coloured Plates. 8vo. cloth, 14s.

MR. COOLEY.

COMPREHENSIVE SUPPLEMENT TO THE PHARMACOPŒIAS.

THE CYCLOPŒDIA OF PRACTICAL RECEIPTS, PRO-
CESSES, AND COLLATERAL INFORMATION IN THE ARTS, MANU-
FACTURES, PROFESSIONS, AND TRADES, INCLUDING MEDICINE,
PHARMACY, AND DOMESTIC ECONOMY; designed as a General Book of
Reference for the Manufacturer, Tradesman, Amateur, and Heads of Families. Fourth
and greatly enlarged Edition, 8vo. cloth, 28s.

MR. W. WHITE COOPER.

I.
ON WOUNDS AND INJURIES OF THE EYE. Illustrated by
17 Coloured Figures and 41 Woodcuts. 8vo. cloth, 12s.

II.
ON NEAR SIGHT, AGED SIGHT, IMPAIRED VISION,
AND THE MEANS OF ASSISTING SIGHT. With 31 Illustrations on Wood.
Second Edition. Fcap. 8vo. cloth, 7s. 6d.

SIR ASTLEY COOPER, BART., F.R.S.

ON THE STRUCTURE AND DISEASES OF THE TESTIS.
With 24 Plates. Second Edition. Royal 4to., 20s.

MR. COOPER.

A DICTIONARY OF PRACTICAL SURGERY AND ENCYCLOPÆDIA OF SURGICAL SCIENCE. New Edition, brought down to the present time. By SAMUEL A. LANE, F.R.C.S., assisted by various eminent Surgeons. Vol. I., 8vo. cloth, £1. 5s.

MR. HOLMES COOTE, F.R.C.S.

A REPORT ON SOME IMPORTANT POINTS IN THE TREATMENT OF SYPHILIS. 8vo. cloth, 5s.

DR. COTTON.

PHTHISIS AND THE STETHOSCOPE; OR, THE PHYSICAL SIGNS OF CONSUMPTION. Third Edition. Foolsap 8vo. cloth, 3s.

MR. COULSON.

ON DISEASES OF THE BLADDER AND PROSTATE GLAND. New Edition, revised. *In Preparation.*

MR. WALTER COULSON, F.R.C.S.

STONE IN THE BLADDER: With Special Reference to its Prevention, Early Symptoms, and Treatment by Lithotrity. 8vo. cloth, 6s.

MR. WILLIAM CRAIG, L.F.P.S., GLASGOW.

ON THE INFLUENCE OF VARIATIONS OF ELECTRIC TENSION AS THE REMOTE CAUSE OF EPIDEMIC AND OTHER DISEASES. 8vo. cloth, 10s.

MR. CURLING, F.R.S.

I.
OBSERVATIONS ON DISEASES OF THE RECTUM. Third Edition. 8vo. cloth, 7s. 6d.

II.
A PRACTICAL TREATISE ON DISEASES OF THE TESTIS, SPERMATIC CORD, AND SCROTUM. Third Edition, with Engravings. 8vo. cloth, 16s.

DR. WILLIAM DALE, M.D. LOND.

A COMPENDIUM OF PRACTICAL MEDICINE AND MORBID ANATOMY. With Plates, 12mo. cloth, 7s.

DR. DALRYMPLE, M.R.C.P., F.R.C.S.

THE CLIMATE OF EGYPT: METEOROLOGICAL AND MEDICAL OBSERVATIONS, with Practical Hints for Invalid Travellers. Post 8vo. cloth, 4s.

MR. JOHN DALRYMPLE, F.R.S., F.R.C.S.

PATHOLOGY OF THE HUMAN EYE. Complete in Nine Fasciculi: imperial 4to., 20s. each; half-bound morocco, gilt tops, 9l. 15s.

DR. HERBERT DAVIES.

ON THE PHYSICAL DIAGNOSIS OF DISEASES OF THE LUNGS AND HEART. Second Edition. Post 8vo. cloth, 8s.

DR. DAVEY.

I.
THE GANGLIONIC NERVOUS SYSTEM: its Structure, Functions,
and Diseases. 8vo. cloth, 9s.

II.
ON THE NATURE AND PROXIMATE CAUSE OF IN-
SANITY. Post 8vo. cloth, 3s.

DR. HENRY DAY, M.D., M.R.C.P.

CLINICAL HISTORIES; with Comments. 8vo. cloth, 7s. 6d.

MR. DIXON.

A GUIDE TO THE PRACTICAL STUDY OF DISEASES OF
THE EYE. Third Edition. Post 8vo. cloth, 9s.

DR. DOBELL.

I.
DEMONSTRATIONS OF DISEASES IN THE CHEST, AND
THEIR PHYSICAL DIAGNOSIS. With Coloured Plates. 8vo. cloth, 12s. 6d.

II.
LECTURES ON THE GERMS AND VESTIGES OF DISEASE,
and on the Prevention of the Invasion and Fatality of Disease by Periodical Examinations.
8vo. cloth, 6s. 6d.

III.
ON TUBERCULOSIS: ITS NATURE, CAUSE, AND TREAT-
MENT; with Notes on Pancreatic Juice. Second Edition. Crown 8vo. cloth, 3s. 6d.

IV.
LECTURES ON WINTER COUGH (CATARRH, BRONCHITIS,
EMPHYSEMA, ASTHMA); with an Appendix on some Principles of Diet in
Disease. Post 8vo. cloth, 5s. 6d.

V.
LECTURES ON THE TRUE FIRST STAGE OF CONSUMP-
TION. Crown 8vo. cloth, 3s. 6d.

DR. TOOGOOD DOWNING.

NEURALGIA: its various Forms, Pathology, and Treatment. THE
JACKSONIAN PRIZE ESSAY FOR 1850. 8vo. cloth, 10s. 6d.

DR. DRUITT, F.R.C.S.

THE SURGEON'S VADE-MECUM; with numerous Engravings on
Wood. Ninth Edition. Foolscap 8vo. cloth, 12s. 6d.

MR. DUNN, F.R.C.S.

PSYCHOLOGY—PHYSIOLOGICAL, 4s.; MEDICAL, 3s.

MR. ERNEST EDWARDS, B.A.

PHOTOGRAPHS OF EMINENT MEDICAL MEN, with brief
Analytical Notices of their Works. Vols. I. and II. (24 Portraits), 4to. cloth, 24s. each.

SIR JAMES EYRE, M.D.

I.
THE STOMACH AND ITS DIFFICULTIES. Sixth Edition,
by Mr. BEALE. Fcap. 8vo., 2s. 6d.

II.
PRACTICAL REMARKS ON SOME EXHAUSTING DIS-
EASES. Second Edition. Post 8vo. cloth, 4s. 6d.

DR. FAYRER, M.D., F.R.C.S., C.S.I.

CLINICAL SURGERY IN INDIA. With Engravings. 8vo. cloth, 16s.

DR. FENWICK.

THE MORBID STATES OF THE STOMACH AND DUODENUM, AND THEIR RELATIONS TO THE DISEASES OF OTHER ORGANS. With 10 Plates. 8vo. cloth, 12s.

SIR WILLIAM FERGUSSON, BART., F.R.S.

I.

A SYSTEM OF PRACTICAL SURGERY; with numerous Illustrations on Wood. Fourth Edition. Fcap. 8vo. cloth, 12s. 6d.

II.

LECTURES ON THE PROGRESS OF ANATOMY AND SURGERY DURING THE PRESENT CENTURY. With numerous Engravings. 8vo. cloth, 10s. 6d.

SIR JOHN FIFE, F.R.C.S. AND MR. URQUHART.

MANUAL OF THE TURKISH BATH. Heat a Mode of Cure and a Source of Strength for Men and Animals. With Engravings. Post 8vo. cloth, 5s.

MR. FLOWER, F.R.S., F.R.C.S.

DIAGRAMS OF THE NERVES OF THE HUMAN BODY, exhibiting their Origin, Divisions, and Connexions, with their Distribution to the various Regions of the Cutaneous Surface, and to all the Muscles. Folio, containing Six Plates, 14s.

MR. FLUX.

THE LAW TO REGULATE THE SALE OF POISONS WITHIN GREAT BRITAIN. Crown 8vo. cloth, 2s. 6d.

MR. FOWNES, PH.D., F.R.S.

I.

A MANUAL OF CHEMISTRY; with 187 Illustrations on Wood. Tenth Edition. Fcap. 8vo. cloth, 14s.

Edited by H. BENCKE JONES, M.D., F.R.S., and HENRY WATTS, B.A., F.R.S.

II.

CHEMISTRY, AS EXEMPLIFYING THE WISDOM AND BENEFICENCE OF GOD. Second Edition. Fcap. 8vo. cloth, 4s. 6d.

III.

INTRODUCTION TO QUALITATIVE ANALYSIS. Post 8vo. cloth, 2s.

DR. D. J. T. FRANCIS.

CHANGE OF CLIMATE; considered as a Remedy in Dyspeptic, Pulmonary, and other Chronic Affections; with an Account of the most Eligible Places of Residence for Invalids, at different Seasons of the Year. Post 8vo. cloth, 8s. 6d.

DR. W. FRAZER.

ELEMENTS OF MATERIA MEDICA; containing the Chemistry and Natural History of Drugs—their Effects, Doses, and Adulterations. Second Edition. 8vo. cloth, 10s. 6d.

DR. FULLER.

I.

ON DISEASES OF THE LUNGS AND AIR PASSAGES. Second Edition. 8vo. cloth, 12s. 6d.

II.

ON DISEASES OF THE HEART AND GREAT VESSELS. 8vo. cloth, 7s. 6d.

III.

ON RHEUMATISM, RHEUMATIC GOUT, AND SCIATICA: their Pathology, Symptoms, and Treatment. Third Edition. 8vo. cloth, 12s. 6d.

PROFESSOR FRESSENIUS.

A SYSTEM OF INSTRUCTION IN CHEMICAL ANALYSIS,

Edited by ARTHUR VACHER.

QUALITATIVE. Seventh Edition. 8vo. cloth, 9s.

QUANTITATIVE. Fourth Edition. 8vo. cloth, 18s.

MR. GALLOWAY.

I.

THE FIRST STEP IN CHEMISTRY. With numerous Engravings.

Fourth Edition. Fcap. 8vo. cloth, 6s. 6d. II.

A KEY TO THE EXERCISES CONTAINED IN ABOVE. Fcap.

8vo., 2s. 6d.

III.

THE SECOND STEP IN CHEMISTRY; or, the Student's Guide to the Higher Branches of the Science. With Engravings. 8vo. cloth, 10s.

IV.

A MANUAL OF QUALITATIVE ANALYSIS. Fourth Edition.

Post 8vo. cloth, 6s. 6d.

V.

CHEMICAL TABLES. On Five Large Sheets, for School and Lecture Rooms. Second Edition. 4s. 6d.

MR. J. SAMPSON GAMGEE.

HISTORY OF A SUCCESSFUL CASE OF AMPUTATION AT THE HIP-JOINT (the limb 48-in. in circumference, 99 pounds weight). With 4 Photographs. 4to cloth, 10s. 6d.

MR. F. J. GANT, F.R.C.S.

I.

THE PRINCIPLES OF SURGERY: Clinical, Medical, and Operative. With Engravings. 8vo. cloth, 18s.

II.

THE IRRITABLE BLADDER: its Causes and Curative Treatment. Second Edition, enlarged. Crown 8vo. cloth, 5s.

MR. GAY, F.R.C.S.

ON VARICOSE DISEASE OF THE LOWER EXTREMITIES.

LETTESOMIAN LECTURES. With Plates. 8vo. cloth, 5s.

SIR DUNCAN GIBB, BART., M.D.

I.

ON DISEASES OF THE THROAT AND WINDPIPE, as reflected by the Laryngoscope. Second Edition. With 116 Engravings. Post 8vo. cloth, 10s. 6d.

II.

THE LARYNGOSCOPE IN DISEASES OF THE THROAT, with a Chapter on Rhinoscopy. Third Edition, with Engravings. Crown 8vo., cloth, 5s.

MRS. GODFREY.

ON THE NATURE, PREVENTION, TREATMENT, AND CURE OF SPINAL CURVATURES and DEFORMITIES of the CHEST and LIMBS, without ARTIFICIAL SUPPORTS or any MECHANICAL APPLIANCES. Third Edition, Revised and Enlarged. 8vo. cloth 5s.

DR. GORDON, M.D., C.B.

I.

ARMY HYGIENE. 8vo. cloth, 20s.

II.

CHINA, FROM A MEDICAL POINT OF VIEW; IN 1860 AND 1861; With a Chapter on Nagasaki as a Sanatorium. 8vo. cloth, 10s. 6d.

DR. GAIRDNER.

ON GOUT; its History, its Causes, and its Cure. Fourth Edition. Post
8vo. cloth, 8s. 6d.

DR. GRANVILLE, F.R.S.

I.
THE MINERAL SPRINGS OF VICHY: their Efficacy in the
Treatment of Gout, Indigestion, Gravel, &c. 8vo. cloth, 3s.

II.

ON SUDDEN DEATH. Post 8vo., 2s. 6d.

DR. GRAVES M.D., F.R.S.

STUDIES IN PHYSIOLOGY AND MEDICINE. Edited by
Dr. Stokes. With Portrait and Memoir. 8vo. cloth, 14s.

DR. S. C. GRIFFITH, M.D.

ON DERMATOLOGY AND THE TREATMENT OF SKIN
DISEASES BY MEANS OF HERBS, IN PLACE OF ARSENIC AND
MERCURY. Fcap. 8vo. cloth, 3s.

MR. GRIFFITHS.

CHEMISTRY OF THE FOUR SEASONS—Spring, Summer,
Autumn, Winter. Illustrated with Engravings on Wood. Second Edition. Foolsap
8vo. cloth, 7s. 6d.

DR. GULLY.

THE SIMPLE TREATMENT OF DISEASE; deduced from the
Methods of Expectancy and Revulsion. 18mo. cloth, 4s.

DR. GUY AND DR. JOHN HARLEY.

HOOVER'S PHYSICIAN'S VADE-MECUM: OR, MANUAL OF
THE PRINCIPLES AND PRACTICE OF PHYSIC. Seventh Edition. With
Engravings. Foolsap 8vo. cloth, 12s. 6d.

GUY'S HOSPITAL REPORTS. Third Series. Vol. XIV., 8vo. 7s. 6d.

DR. HABERSHON, F.R.C.P.

I.
ON DISEASES OF THE ABDOMEN. comprising those of the
Stomach and other Parts of the Alimentary Canal, Œsophagus, Stomach, Cæcum,
Intestines, and Peritoneum. Second Edition, with Plates. 8vo. cloth, 14s.

II.

ON THE INJURIOUS EFFECTS OF MERCURY IN THE
TREATMENT OF DISEASE. Post 8vo. cloth, 3s. 6d.

DR. C. RADCLYFFE HALL.

TORQUAY IN ITS MEDICAL ASPECT AS A RESORT FOR
PULMONARY INVALIDS. Post 8vo. cloth, 5s.

DR. MARSHALL HALL, F.R.S.

I.
PRONE AND POSTURAL RESPIRATION IN DROWNING
AND OTHER FORMS OF APNŒA OR SUSPENDED RESPIRATION.
Post 8vo. cloth. 5s.

II.

PRACTICAL OBSERVATIONS AND SUGGESTIONS IN MEDI-
CINE. Second Series. Post 8vo. cloth, 8s. 6d.

MR. HARDWICH.

A MANUAL OF PHOTOGRAPHIC CHEMISTRY. With Engravings. Seventh Edition. Foolsap 8vo. cloth, 7s. 6d.

DR. J. BOWER HARRISON, M.D., M.R.C.P.

I.
LETTERS TO A YOUNG PRACTITIONER ON THE DISEASES OF CHILDREN. Foolsap 8vo. cloth, 3s.

II.

ON THE CONTAMINATION OF WATER BY THE POISON OF LEAD, and its Effects on the Human Body. Foolsap 8vo. cloth, 3s. 6d.

DR. HARTWIG.

I.

ON SEA BATHING AND SEA AIR. Second Edition. Fcap. 8vo., 2s. 6d.

II.

ON THE PHYSICAL EDUCATION OF CHILDREN. Fcap. 8vo., 2s. 6d.

DR. A. H. HASSALL.

THE URINE, IN HEALTH AND DISEASE; being an Explanation of the Composition of the Urine, and of the Pathology and Treatment of Urinary and Renal Disorders. Second Edition. With 79 Engravings (23 Coloured). Post 8vo. cloth, 12s. 6d.

MR. ALFRED HAVILAND, M.R.C.S.

CLIMATE, WEATHER, AND DISEASE; being a Sketch of the Opinions of the most celebrated Ancient and Modern Writers with regard to the Influence of Climate and Weather in producing Disease. With Four coloured Engravings. 8vo. cloth, 7s.

DR. HEADLAND, M.D., F.R.C.P.

I.

ON THE ACTION OF MEDICINES IN THE SYSTEM. Fourth Edition. 8vo. cloth, 14s.

II.

A MEDICAL HANDBOOK; comprehending such Information on Medical and Sanitary Subjects as is desirable in Educated Persons. Second Thousand. Foolsap 8vo. cloth, 5s.

DR. HEALE.

I.

A TREATISE ON THE PHYSIOLOGICAL ANATOMY OF THE LUNGS. With Engravings. 8vo. cloth, 8s.

II.

A TREATISE ON VITAL CAUSES. 8vo. cloth, 9s.

MR. CHRISTOPHER HEATH, F.R.C.S.

I.

PRACTICAL ANATOMY: a Manual of Dissections. With numerous Engravings. Fcap. 8vo. cloth, 10s. 6d.

II.

A MANUAL OF MINOR SURGERY AND BANDAGING, FOR THE USE OF HOUSE-SURGEONS, DRESSERS, AND JUNIOR PRACTITIONERS. With Illustrations. Third Edition. Fcap. 8vo. cloth, 5s.

III.

INJURIES AND DISEASES OF THE JAWS. JACKSONIAN PRIZE ESSAY. With Engravings. 8vo. cloth, 12s.

MR. HIGGINBOTTOM, F.R.S., F.R.C.S.E.

A PRACTICAL ESSAY ON THE USE OF THE NITRATE OF SILVER IN THE TREATMENT OF INFLAMMATION, WOUNDS, AND ULCERS. Third Edition, 8vo. cloth, 6s.

DR. HINDS.

THE HARMONIES OF PHYSICAL SCIENCE IN RELATION TO THE HIGHER SENTIMENTS; with Observations on Medical Studies, and on the Moral and Scientific Relations of Medical Life. Post 8vo. cloth, 4s.

MR. J. A. HINGESTON, M.R.C.S.

TOPICS OF THE DAY, MEDICAL, SOCIAL, AND SCIENTIFIC. Crown 8vo. cloth, 7s. 6d.

DR. HODGES.

THE NATURE, PATHOLOGY, AND TREATMENT OF PUERPERAL CONVULSIONS. Crown 8vo. cloth, 3s.

DR. DECIMUS HODGSON.

THE PROSTATE GLAND, AND ITS ENLARGEMENT IN OLD AGE. With 12 Plates. Royal 8vo. cloth, 6s.

MR. JABEZ HOGG.

A MANUAL OF OPHTHALMOSCOPIC SURGERY; being a Practical Treatise on the Use of the Ophthalmoscope in Diseases of the Eye. Third Edition. With Coloured Plates. 8vo. cloth, 10s. 6d.

MR. LUTHER HOLDEN, F.R.C.S.

I.

HUMAN OSTEOLOGY: with Plates, showing the Attachments of the Muscles. Third Edition. 8vo. cloth, 16s.

II.

A MANUAL OF THE DISSECTION OF THE HUMAN BODY. With Engravings on Wood. Third Edition. 8vo. cloth, 16s.

MR. BARNARD HOLT, F.R.C.S.

ON THE IMMEDIATE TREATMENT OF STRICTURE OF THE URETHRA. Third Edition, Enlarged. 8vo. cloth, 6s.

SIR CHARLES HOOD, M.D.

SUGGESTIONS FOR THE FUTURE PROVISION OF CRIMINAL LUNATICS. 8vo. cloth, 5s. 6d.

DR. P. HOOD.

THE SUCCESSFUL TREATMENT OF SCARLET FEVER; also, OBSERVATIONS ON THE PATHOLOGY AND TREATMENT OF CROWING INSPIRATIONS OF INFANTS. Post 8vo. cloth, 5s.

MR. JOHN HORSLEY.

A CATECHISM OF CHEMICAL PHILOSOPHY; being a Familiar Exposition of the Principles of Chemistry and Physics. With Engravings on Wood. Designed for the Use of Schools and Private Teachers. Post 8vo. cloth, 6s. 6d.

DR. JAMES A. HORTON, M.D.

PHYSICAL AND MEDICAL CLIMATE AND METEOROLOGY OF THE WEST COAST OF AFRICA. 8vo. cloth, 10s.

MR. LUKE HOWARD, F.R.S.

ESSAY ON THE MODIFICATIONS OF CLOUDS. Third Edition, by W. D. and E. HOWARD. With 6 Lithographic Plates, from Pictures by Kenyon. 4to. cloth, 10s. 6d.

DR. HAMILTON HOWE, M.D.

A THEORETICAL INQUIRY INTO THE PHYSICAL CAUSE OF EPIDEMIC DISEASES. Accompanied with Tables. 8vo. cloth, 7s.

DR. HUFELAND.

THE ART OF PROLONGING LIFE. Second Edition. Edited by ERASMUS WILSON, F.R.S. Foolscap 8vo., 2s. 6d.

MR. W. CURTIS HUGMAN, F.R.C.S.

ON HIP-JOINT DISEASE; with reference especially to Treatment by Mechanical Means for the Relief of Contraction and Deformity of the Affected Limb. With Plates. Re-issue, enlarged. 8vo. cloth, 3s. 6d.

MR. HULKE, F.R.C.S.

A PRACTICAL TREATISE ON THE USE OF THE OPHTHALMOSCOPE. Being the Jacksonian Prize Essay for 1859. Royal 8vo. cloth, 8s.

DR. HENRY HUNT.

ON HEARTBURN AND INDIGESTION. 8vo. cloth, 5s.

MR. G. Y. HUNTER, M.R.C.S.

BODY AND MIND: the Nervous System and its Derangements. Fcap. 8vo. cloth, 3s. 6d.

MR. JONATHAN HUTCHINSON, F.R.C.S.

A CLINICAL MEMOIR ON CERTAIN DISEASES OF THE EYE AND EAR, CONSEQUENT ON INHERITED SYPHILIS; with an appended Chapter of Commentaries on the Transmission of Syphilis from Parent to Offspring, and its more remote Consequences. With Plates and Woodcuts, 8vo. cloth, 9s.

~~~~~  
 PROF. HUXLEY, LL.D., F.R.S.

INTRODUCTION TO THE CLASSIFICATION OF ANIMALS.  
 With Engravings. 8vo. cloth, 6s.

~~~~~  
 DR. INMAN, M.R.C.P.

I.
 ON MYALGIA: ITS NATURE, CAUSES, AND TREATMENT;
 being a Treatise on Painful and other Affections of the Muscular System. Second Edition. 8vo. cloth, 9s.

II.
 FOUNDATION FOR A NEW THEORY AND PRACTICE
 OF MEDICINE. Second Edition. Crown 8vo. cloth, 10s.

~~~~~  
 DR. JAGO, M.D. OXON., A.B. CANTAB.

ENTOPTICS, WITH ITS USES IN PHYSIOLOGY AND  
 MEDICINE. With 54 Engravings. Crown 8vo. cloth, 5s.

~~~~~  
 DR. PROSSER JAMES, M.D.

SORE-THROAT: ITS NATURE, VARIETIES, AND TREAT-
 MENT; including the Use of the LARYNGOSCOPE as an Aid to Diagnosis. Second Edition; with numerous Engravings. Post 8vo. cloth, 5s.

~~~~~  
 DR. JENCKEN, M.D., M.R.C.P.

THE CHOLERA: ITS ORIGIN, IDIOSYNCRACY, AND  
 TREATMENT. Fcap. 8vo. cloth, 2s. 6d.

~~~~~  
 DR. HANDFIELD JONES, M.B., F.R.C.P.

CLINICAL OBSERVATIONS ON FUNCTIONAL NERVOUS
 DISORDERS. Post 8vo. cloth, 10s. 6d.

~~~~~  
 DR. H. BENICE JONES, M.D., F.R.S.

I.  
 LECTURES ON SOME OF THE APPLICATIONS OF  
 CHEMISTRY AND MECHANICS TO PATHOLOGY AND THERA-  
 PEUTICS. 8vo. cloth, 12s.

II.  
 CROONIAN LECTURES ON MATTER AND FORCE. Fcap. 8vo.  
 cloth, 5s.

~~~~~  
 DR. HANDFIELD JONES, F.R.S., & DR. EDWARD H. SIEVEKING.

A MANUAL OF PATHOLOGICAL ANATOMY. Illustrated with
 numerous Engravings on Wood. Foolsap 8vo. cloth, 12s. 6d.

DR. JAMES JONES, M.D., M.R.C.P.

ON THE USE OF PERCHLORIDE OF IRON AND OTHER
CHALYBEATE SALTS IN THE TREATMENT OF CONSUMPTION. Crown
8vo. cloth, 3s. 6d.

MR. WHARTON JONES, F.R.S.

I.
A MANUAL OF THE PRINCIPLES AND PRACTICE OF
OPHTHALMIC MEDICINE AND SURGERY; with Nine Coloured Plates and
173 Wood Engravings. Third Edition, thoroughly revised. Foolsap 8vo. cloth, 12s. 6d.

II.
THE WISDOM AND BENEFICENCE OF THE ALMIGHTY,
AS DISPLAYED IN THE SENSE OF VISION. Actonian Prize Essay. With
Illustrations on Steel and Wood. Foolsap 8vo. cloth, 4s. 6d.

III.
DEFECTS OF SIGHT AND HEARING: their Nature, Causes, Pre-
vention, and General Management. Second Edition, with Engravings. Fcap. 8vo. 2s. 6d.

IV.
A CATECHISM OF THE MEDICINE AND SURGERY OF
THE EYE AND EAR. For the Clinical Use of Hospital Students. Fcap. 8vo. 2s. 6d.

V.
A CATECHISM OF THE PHYSIOLOGY AND PHILOSOPHY
OF BODY, SENSE, AND MIND. For Use in Schools and Colleges. Fcap. 8vo.,
2s. 6d.

DR. LAENNEC.

A MANUAL OF AUSCULTATION AND PERCUSSION. Trans-
lated and Edited by J. B. SHARPE, M.R.C.S. 3s.

DR. LANE, M.A.

HYDROPATHY; OR, HYGIENIC MEDICINE. An Explanatory
Essay. Second Edition. Post 8vo. cloth, 5s.

SIR WM. LAWRENCE, BART., F.R.S

I.
LECTURES ON SURGERY. 8vo. cloth, 16s.

II.
A TREATISE ON RUPTURES. The Fifth Edition, considerably
enlarged. 8vo. cloth, 16s.

DR. LEARED, M.R.C.P.

IMPERFECT DIGESTION: ITS CAUSES AND TREATMENT.
Fourth Edition. Foolsap 8vo. cloth, 4s.

MR. HENRY LEE, F.R.C.S.

I.
ON SYPHILIS. Second Edition. With Coloured Plates. 8vo. cloth, 10s.

II.
ON DISEASES OF THE VEINS, HÆMORRHOIDAL TUMOURS,
AND OTHER AFFECTIONS OF THE RECTUM. Second Edition. 8vo. cloth, 8s.

DR. EDWIN LEE.

I.
THE EFFECT OF CLIMATE ON TUBERCULOUS DISEASE,
with Notices of the chief Foreign Places of Winter Resort. Small 8vo. cloth, 4s. 6d.

II.
THE WATERING PLACES OF ENGLAND, CONSIDERED
with Reference to their Medical Topography. Fourth Edition. Fcap. 8vo. cloth, 7s. 6d.

III.
THE PRINCIPAL BATHS OF FRANCE. Fourth Edition.
Fcap. 8vo. cloth, 3s. 6d.

IV.
THE BATHS OF GERMANY. Fourth Edition. Post 8vo. cloth, 7s.

V.
THE BATHS OF SWITZERLAND. 12mo. cloth, 3s. 6d.

VI.
HOMŒOPATHY AND HYDROPATHY IMPARTIALLY AP-
PRECIATED. Fourth Edition. Post 8vo. cloth, 3s.

~~~~~  
DR. ROBERT LEE, F.R.S.

I.  
CONSULTATIONS IN MIDWIFERY. Foolscap 8vo. cloth, 4s. 6d.

II.  
A TREATISE ON THE SPECULUM; with Three Hundred Cases.  
8vo. cloth, 4s. 6d.

III.  
CLINICAL REPORTS OF OVARIAN AND UTERINE DIS-  
EASES, with Commentaries. Foolscap 8vo. cloth, 6s. 6d.

IV.  
CLINICAL MIDWIFERY: comprising the Histories of 545 Cases of  
Difficult, Preternatural, and Complicated Labour, with Commentaries. Second Edition.  
Foolscap 8vo. cloth, 5s.

~~~~~  
DR. LEISHMAN, M.D., F.F.P.S.

THE MECHANISM OF PARTURITION: An Essay, Historical and
Critical. With Engravings. 8vo. cloth, 5s.

~~~~~  
MR. LISTON, F.R.S.

PRACTICAL SURGERY. Fourth Edition. 8vo. cloth, 22s.

~~~~~  
MR. H. W. LOBB, L.S.A., M.R.C.S.E.

ON SOME OF THE MORE OBSCURE FORMS OF NERVOUS
AFFECTIONS, THEIR PATHOLOGY AND TREATMENT. Re-issue,
with the Chapter on Galvanism entirely Re-written. With Engravings. 8vo. cloth, 8s.

~~~~~  
DR. LOGAN, M.D., M.R.C.P.LOND.

ON OBSTINATE DISEASES OF THE SKIN. Fcap. 8vo. cloth, 2s. 6d.

~~~~~  
LONDON HOSPITAL.

CLINICAL LECTURES AND REPORTS BY THE MEDICAL
AND SURGICAL STAFF. With Illustrations. Vols. I. to IV. 8vo. cloth, 7s. 6d.

LONDON MEDICAL SOCIETY OF OBSERVATION.

WHAT TO OBSERVE AT THE BED-SIDE, AND AFTER
DEATH. Published by Authority. Second Edition. Foolscap 8vo. cloth, 4s. 6d.

MR. HENRY LOWNDES, M.R.C.S.

AN ESSAY ON THE MAINTENANCE OF HEALTH. Fcap.
8vo. cloth, 2s. 6d.

MR. M'CLELLAND, F.L.S., F.G.S.

THE MEDICAL TOPOGRAPHY, OR CLIMATE AND SOILS,
OF BENGAL AND THE N. W. PROVINCES. Post 8vo. cloth, 4s. 6d.

DR. MACLACHLAN, M.D., F.R.C.P.L.

THE DISEASES AND INFIRMITIES OF ADVANCED LIFE.
8vo. cloth, 16s.

DR. A. C. MACLEOD, M.R.C.P.LOND.

ACHOLIC DISEASES; comprising Jaundice, Diarrhoea, Dysentery,
and Cholera. Post 8vo. cloth, 5s. 6d.

DR. GEORGE H. B. MACLEOD, F.R.C.S.E.

I.
OUTLINES OF SURGICAL DIAGNOSIS. 8vo. cloth, 12s. 6d.

II.

NOTES ON THE SURGERY OF THE CRIMEAN WAR; with
REMARKS on GUN-SHOT WOUNDS. 8vo. cloth, 10s. 6d.

DR. M. MACLEOD, F.R.C.P. EDIN.

THE THEORY OF THE TREATMENT OF DISEASE ADOPTED
AT BEN RHYDDING. Fcap. 8vo. cloth, 2s. 6d.

MR. JOSEPH MACLISE, F.R.C.S.

I.

SURGICAL ANATOMY. A Series of Dissections, illustrating the Prin-
cipal Regions of the Human Body. Second Edition, folio, cloth, £3. 12s.; half-morocco,
£4. 4s.

II.

ON DISLOCATIONS AND FRACTURES. This Work is Uniform
with "Surgical Anatomy;" folio, cloth, £2. 10s.; half-morocco, £2. 17s.

MR. MACNAMARA.

I.

A MANUAL OF THE DISEASES OF THE EYE. With
Coloured Plates. Fcap. 8vo. cloth, 12s. 6d.

II.

ON DISEASES OF THE EYE; referring principally to those Affections
requiring the aid of the Ophthalmoscope for their Diagnosis. With coloured plates.
8vo. cloth, 10s. 6d.

DR. MCNICOLL, M.R.C.P.

A HAND-BOOK FOR SOUTHPORT, MEDICAL & GENERAL;
with Copious Notices of the Natural History of the District. Second Edition. Post 8vo.
cloth, 3s. 6d.

DR. MARCET, F.R.S.

ON CHRONIC ALCOHOLIC INTOXICATION; with an INQUIRY
INTO THE INFLUENCE OF THE ABUSE OF ALCOHOL AS A PRE-
DISPOSING CAUSE OF DISEASE. Second Edition, much enlarged. Foolscap
8vo. cloth, 4s. 6d.

DR. J. MACPHERSON, M.D.

CHOLERA IN ITS HOME; with a Sketch of the Pathology and Treatment of the Disease. Crown 8vo. cloth, 5s.

DR. MARKHAM.

I.
DISEASES OF THE HEART: THEIR PATHOLOGY, DIAGNOSIS, AND TREATMENT. Second Edition. Post 8vo. cloth, 6s.

II.
SKODA ON AUSCULTATION AND PERCUSSION. Post 8vo. cloth, 6s.

III.
BLEEDING AND CHANGE IN TYPE OF DISEASES. Gulstonian Lectures for 1864. Crown 8vo. 2s. 6d.

DR. ALEXANDER MARSDEN, M.D., F.R.C.S.

A NEW AND SUCCESSFUL MODE OF TREATING CERTAIN FORMS OF CANCER; to which is prefixed a Practical and Systematic Description of all the Varieties of this Disease. With Coloured Plates. 8vo. cloth, 6s. 6d.

SIR RANALD MARTIN, K.C.B., F.R.S.

INFLUENCE OF TROPICAL CLIMATES IN PRODUCING THE ACUTE ENDEMIC DISEASES OF EUROPEANS; including Practical Observations on their Chronic Sequelæ under the Influences of the Climate of Europe. Second Edition, much enlarged. 8vo. cloth, 20s.

MR. C. F. MAUNDER, F.R.C.S.

OPERATIVE SURGERY. With 158 Engravings. Post 8vo. 6s.

DR. MAYNE, M.D., LL.D.

I.
AN EXPOSITORY LEXICON OF THE TERMS, ANCIENT AND MODERN, IN MEDICAL AND GENERAL SCIENCE. 8vo. cloth, £2. 10s.

II.
A MEDICAL VOCABULARY; or, an Explanation of all Names, Synonymes, Terms, and Phrases used in Medicine and the relative branches of Medical Science. Third Edition. Fcap. 8vo. cloth, 8s. 6d.

DR. MERYON, M.D., F.R.C.P.

PATHOLOGICAL AND PRACTICAL RESEARCHES ON THE VARIOUS FORMS OF PARALYSIS. 8vo. cloth, 6s.

DR. MILLINGEN.

ON THE TREATMENT AND MANAGEMENT OF THE INSANE; with Considerations on Public and Private Lunatic Asylums. 18mo. cloth, 4s. 6d.

DR. W. J. MOORE, M.D.

I.
HEALTH IN THE TROPICS; or, Sanitary Art applied to Europeans in India. 8vo. cloth, 9s.

II.
A MANUAL OF THE DISEASES OF INDIA. Fcap. 8vo. cloth, 5s.

DR. JAMES MORRIS, M.D.LOND.

I.
GERMINAL MATTER AND THE CONTACT THEORY:

An Essay on the Morbid Poisons. Second Edition. Crown 8vo. cloth, 4s. 6d.

II.

IRRITABILITY: Popular and Practical Sketches of Common Morbid States and Conditions bordering on Disease; with Hints for Management, Alleviation, and Cure. Crown 8vo. cloth, 4s. 6d.

PROFESSOR MULDER, UTRECHT.

THE CHEMISTRY OF WINE. Edited by H. BENCE JONES, M.D., F.R.S. Fcap. 8vo. cloth, 6s.

DR. W. MURRAY, M.D., M.R.C.P.

EMOTIONAL DISORDERS OF THE SYMPATHETIC SYSTEM OF NERVES. Crown 8vo. cloth, 3s. 6d.

DR. MUSHET, M.B., M.R.C.P.

ON APOPLEXY, AND ALLIED AFFECTIONS OF THE BRAIN. 8vo. cloth, 7s.

MR. NAYLER, F.R.C.S.

ON THE DISEASES OF THE SKIN. With Plates. 8vo. cloth, 10s. 6d.

DR. BIRKBECK NEVINS.

THE PRESCRIBER'S ANALYSIS OF THE BRITISH PHARMACOPEIA of 1867. 32mo. cloth, 3s. 6d.

DR. THOS. NICHOLSON, M.D.

ON YELLOW FEVER; comprising the History of that Disease as it appeared in the Island of Antigua. Fcap. 8vo. cloth, 2s. 6d.

DR. NOAD, PH.D., F.R.S.

THE INDUCTION COIL, being a Popular Explanation of the Electrical Principles on which it is constructed. Third Edition. With Engravings. Fcap. 8vo. cloth, 3s.

DR. NOBLE.

THE HUMAN MIND IN ITS RELATIONS WITH THE BRAIN AND NERVOUS SYSTEM. Post 8vo. cloth, 4s. 6d.

MR. NUNNELEY, F.R.C.S.E.

I.
ON THE ORGANS OF VISION; THEIR ANATOMY AND PHYSIOLOGY. With Plates, 8vo. cloth, 15s.

II.

A TREATISE ON THE NATURE, CAUSES, AND TREATMENT OF ERYSIPELAS. 8vo. cloth, 10s. 6d.

DR. OPPERT, M.D.

I.
HOSPITALS, INFIRMARIES, AND DISPENSARIES; their Construction, Interior Arrangement, and Management, with Descriptions of existing Institutions. With 58 Engravings. Royal 8vo. cloth, 10s. 6d.

II.

VISCERAL AND HEREDITARY SYPHILIS. 8vo. cloth, 5s.

MR. LANGSTON PARKER.

THE MODERN TREATMENT OF SYPHILITIC DISEASES, both Primary and Secondary; comprising the Treatment of Constitutional and Confirmed Syphilis, by a safe and successful Method. Fourth Edition, 8vo. cloth, 10s.

DR. PARKES, F.R.S., F.R.C.P.

I.
A MANUAL OF PRACTICAL HYGIENE; intended especially for
the Medical Officers of the Army. With Plates and Woodcuts. 3rd Edition, 8vo. cloth, 16s.

II.
THE URINE: ITS COMPOSITION IN HEALTH AND DISEASE,
AND UNDER THE ACTION OF REMEDIES. 8vo. cloth, 12s.

DR. PARKIN, M.D., F.R.C.S.

I.
THE ANTIDOTAL TREATMENT AND PREVENTION OF
THE EPIDEMIC CHOLERA Third Edition. 8vo. cloth, 7s. 6d.

II.
THE CAUSATION AND PREVENTION OF DISEASE; with
the Laws regulating the Extrication of Malaria from the Surface, and its Diffusion in the
surrounding Air. 8vo. cloth, 5s.

MR. JAMES PART, F.R.C.S.

THE MEDICAL AND SURGICAL POCKET CASE BOOK,
for the Registration of important Cases in Private Practice, and to assist the Student of
Hospital Practice. Second Edition. 2s. 6d.

DR. PATTERSON, M.D.

EGYPT AND THE NILE AS A WINTER RESORT FOR
PULMONARY AND OTHER INVALIDS. Fcap. 8vo. cloth, 3s.

DR. PAVY, M.D., F.R.S., F.R.C.P.

I.
DIABETES: RESEARCHES ON ITS NATURE AND TREAT-
MENT. Second Edition. With Engravings. 8vo. cloth, 10s.

II.
DIGESTION: ITS DISORDERS AND THEIR TREATMENT.
Second Edition. 8vo. cloth, 8s. 6d.

DR. PEACOCK, M.D., F.R.C.P.

I.
ON MALFORMATIONS OF THE HUMAN HEART. With
Original Cases and Illustrations. Second Edition. With 3 Plates. 8vo. cloth, 10s.

II.
ON SOME OF THE CAUSES AND EFFECTS OF VALVULAR
DISEASE OF THE HEART. With Engravings. 8vo. cloth, 5s.

DR. W. H. PEARSE, M.D. EDIN.

NOTES ON HEALTH IN CALCUTTA AND BRITISH
EMIGRANT SHIPS, including Ventilation, Diet, and Disease. Fcap. 8vo. 2s.

DR. PEREIRA, F.R.S.

SELECTA E PRÆSCRIPTIS. Fourteenth Edition. 24mo. cloth, 5s.

DR. PICKFORD.

HYGIENE; or, Health as Depending upon the Conditions of the Atmo-
sphere, Food and Drinks, Motion and Rest, Sleep and Wakefulness, Secretions, Excre-
tions, and Retentions, Mental Emotions, Clothing, Bathing, &c. Vol. I. 8vo. cloth, 9s.

PROFESSOR PIRRIE, F.R.S.E.

THE PRINCIPLES AND PRACTICE OF SURGERY. With numerous Engravings on Wood. Second Edition. 8vo. cloth, 24s.

PROFESSOR PIRRIE & DR. KEITH.

ACUPRESSURE: an excellent Method of arresting Surgical Hæmorrhage and of accelerating the healing of Wounds. With Engravings. 8vo. cloth, 5s.

DR. PIRRIE, M.D.

ON HAY ASTHMA, AND THE AFFECTION TERMED HAY FEVER. Fcap. 8vo. cloth, 2s. 6d.

PROFESSORS PLATTNER & MUSPRATT.

THE USE OF THE BLOWPIPE IN THE EXAMINATION OF MINERALS, ORES, AND OTHER METALLIC COMBINATIONS. Illustrated by numerous Engravings on Wood. Third Edition. 8vo. cloth, 10s. 6d.

MR. HENRY POWER, F.R.C.S., M.B.LOND.

ILLUSTRATIONS OF SOME OF THE PRINCIPAL DISEASES OF THE EYE: With an Account of their Symptoms, Pathology and Treatment. Twelve Coloured Plates. 8vo. cloth, 20s.

DR. HENRY F. A. PRATT, M.D., M.R.C.P.

I.
THE GENEALOGY OF CREATION, newly Translated from the Unpointed Hebrew Text of the Book of Genesis, showing the General Scientific Accuracy of the Cosmogony of Moses and the Philosophy of Creation. 8vo. cloth, 14s.

II.

ON ECCENTRIC AND CENTRIC FORCE: A New Theory of Projection. With Engravings. 8vo. cloth, 10s.

III.

ON ORBITAL MOTION: The Outlines of a System of Physical Astronomy. With Diagrams. 8vo. cloth, 7s. 6d.

IV.

ASTRONOMICAL INVESTIGATIONS. The Cosmical Relations of the Revolution of the Lunar Apsides. Oceanic Tides. With Engravings. 8vo. cloth, 5s.

V.

THE ORACLES OF GOD: An Attempt at a Re-interpretation. Part I. The Revealed Cosmos. 8vo. cloth, 10s.

THE PRESCRIBER'S PHARMACOPŒIA; containing all the Medicines in the British Pharmacopœia, arranged in Classes according to their Action, with their Composition and Doses. By a Practising Physician. Fifth Edition. 32mo. cloth, 2s. 6d.; roan tuck (for the pocket), 3s. 6d.

DR. JOHN ROWLISON PRETTY.

AIDS DURING LABOUR, including the Administration of Chloroform, the Management of Placenta and Post-partum Hæmorrhage. Fcap. 8vo. cloth, 4s. 6d.

MR. P. C. PRICE, F.R.C.S.

AN ESSAY ON EXCISION OF THE KNEE-JOINT. With Coloured Plates. With Memoir of the Author and Notes by Henry Smith, F.R.C.S. Royal 8vo. cloth, 14s.

MR. LAKE PRICE.

PHOTOGRAPHIC MANIPULATION: A Manual treating of the Practice of the Art, and its various Applications to Nature. With numerous Engravings. Second Edition. Crown 8vo. cloth, 6s. 6d.

DR. PRIESTLEY.

LECTURES ON THE DEVELOPMENT OF THE GRAVID UTERUS. 8vo. cloth, 5s. 6d.

MR. RAINEY.

ON THE MODE OF FORMATION OF SHELLS OF ANIMALS, OF BONE, AND OF SEVERAL OTHER STRUCTURES, by a Process of Molecular Coalescence, Demonstrable in certain Artificially-formed Products. Fcap. 8vo. cloth, 4s. 6d.

MR. ROBERT RAMSAY AND MR. J. OAKLEY COLES.

DEFORMITIES OF THE MOUTH, CONGENITAL AND ACCIDENTAL: Their Mechanical Treatment. With Illustrations. 8vo. cloth, 5s.

DR. F. H. RAMSBOTHAM.

THE PRINCIPLES AND PRACTICE OF OBSTETRIC MEDICINE AND SURGERY. Illustrated with One Hundred and Twenty Plates on Steel and Wood; forming one thick handsome volume. Fifth Edition. 8vo. cloth, 22s.

DR. READE, M.B.T.C.D., L.R.C.S.I.

SYPHILITIC AFFECTIONS OF THE NERVOUS SYSTEM, AND A CASE OF SYMMETRICAL MUSCULAR ATROPHY; with other Contributions to the Pathology of the Spinal Marrow. Post 8vo. cloth, 5s.

PROFESSOR REDWOOD, PH.D.

A SUPPLEMENT TO THE PHARMACOPŒIA: A concise but comprehensive Dispensatory, and Manual of Facts and Formulæ, for the use of Practitioners in Medicine and Pharmacy. Third Edition. 8vo. cloth, 22s.

DR. DU BOIS REYMOND.

ANIMAL ELECTRICITY; Edited by H. BENGE JONES, M.D., F.R.S. With Fifty Engravings on Wood. Foolsap 8vo. cloth, 6s.

DR. REYNOLDS, M.D.LOND, F.R.S.

EPILEPSY: ITS SYMPTOMS, TREATMENT, AND RELATION TO OTHER CHRONIC CONVULSIVE DISEASES. 8vo. cloth, 10s.

II.

THE DIAGNOSIS OF DISEASES OF THE BRAIN, SPINAL CORD, AND THEIR APPENDAGES. 8vo. cloth, 8s.

DR. B. W. RICHARDSON, F.R.S.

ON THE CAUSE OF THE COAGULATION OF THE BLOOD. Being the ASTLEY COOPER PRIZE ESSAY for 1856. With a Practical Appendix. 8vo. cloth, 16s.

DR. RITCHIE, M.D.

ON OVARIAN PHYSIOLOGY AND PATHOLOGY. With Engravings. 8vo. cloth, 6s.

DR. WILLIAM ROBERTS, M.D., F.R.C.P.

AN ESSAY ON WASTING PALSY; being a Systematic Treatise on the Disease hitherto described as ATROPHIE MUSCULAIRE PROGRESSIVE. With Four Plates. 8vo. cloth, 5s.

DR. ROUTH.

INFANT FEEDING, AND ITS INFLUENCE ON LIFE; Or, the Causes and Prevention of Infant Mortality. Second Edition. Fcap. 8vo. cloth, 6s.

DR. W. H. ROBERTSON.

I.
THE NATURE AND TREATMENT OF GOUT. 8vo. cloth, 10s. 6d.

II.
A TREATISE ON DIET AND REGIMEN. Fourth Edition. 2 vols. 12s. post 8vo. cloth.

DR. ROWE.

NERVOUS DISEASES, LIVER AND STOMACH COMPLAINTS, LOW SPIRITS, INDIGESTION, GOUT, ASTHMA, AND DISORDERS PRODUCED BY TROPICAL CLIMATES. With Cases. Sixteenth Edition. Fcap. 8vo. 2s. 6d.

DR. ROYLE, F.R.S., AND DR. HEADLAND, M.D.

A MANUAL OF MATERIA MEDICA AND THERAPEUTICS. With numerous Engravings on Wood. Fifth Edition. Fcap. 8vo. cloth, 12s. 6d.

DR. RYAN, M.D.

INFANTICIDE: ITS LAW, PREVALENCE, PREVENTION, AND HISTORY. 8vo. cloth, 5s.

ST. BARTHOLOMEW'S HOSPITAL.

A DESCRIPTIVE CATALOGUE OF THE ANATOMICAL MUSEUM. Vol. I. (1846), Vol. II. (1851), Vol. III. (1862), 8vo. cloth, 5s. each.

ST. GEORGE'S HOSPITAL REPORTS. Vols. I. to III. 8vo. 7s. 6d.

MR. T. P. SALT, BIRMINGHAM.

ON DEFORMITIES AND DEBILITIES OF THE LOWER EXTREMITIES, AND THE MECHANICAL TREATMENT EMPLOYED IN THE PROMOTION OF THEIR CURE. With Plates. 8vo. cloth, 15s.

DR. SALTER, F.R.S.

ASTHMA. Second Edition. 8vo. cloth, 10s.

DR. SANKEY, M.D. LOND.

LECTURES ON MENTAL DISEASES. 8vo. cloth, 8s.

DR. SANSOM, M.D. LOND.

I.

CHLOROFORM: ITS ACTION AND ADMINISTRATION. A Handbook. With Engravings. Crown 8vo. cloth, 5s.

II.

THE ARREST AND PREVENTION OF CHOLERA; being a Guide to the Antiseptic Treatment. Fcap. 8vo. cloth, 2s. 6d.

MR. SAVORY.

A COMPENDIUM OF DOMESTIC MEDICINE, AND COMPANION TO THE MEDICINE CHEST; intended as a Source of Easy Reference for Clergymen, and for Families residing at a Distance from Professional Assistance. Seventh Edition. 12mo. cloth, 5s.

DR. SCHACHT.

THE MICROSCOPE, AND ITS APPLICATION TO VEGETABLE ANATOMY AND PHYSIOLOGY. Edited by FREDERICK CURREY, M.A. Fcap. 8vo. cloth, 6s.

DR. SCORESBY-JACKSON, M.D., F.R.S.E.

MEDICAL CLIMATOLOGY; or, a Topographical and Meteorological Description of the Localities resorted to in Winter and Summer by Invalids of various classes both at Home and Abroad. With an Isothermal Chart. Post 8vo. cloth, 12s.

DR. SEMPLE.

ON COUGH: its Causes, Varieties, and Treatment. With some practical Remarks on the Use of the Stethoscope as an aid to Diagnosis. Post 8vo. cloth, 4s. 6d.

DR. SEYMOUR.

I.

ILLUSTRATIONS OF SOME OF THE PRINCIPAL DISEASES OF THE OVARIA: their Symptoms and Treatment; to which are prefixed Observations on the Structure and Functions of those parts in the Human Being and in Animals. On India paper. Folio, 16s.

II.

THE NATURE AND TREATMENT OF DROPSY; considered especially in reference to the Diseases of the Internal Organs of the Body, which most commonly produce it. 8vo. 5s.

DR. SHAPTER, M.D., F.R.C.P.

THE CLIMATE OF THE SOUTH OF DEVON, AND ITS INFLUENCE UPON HEALTH. Second Edition, with Maps. 8vo. cloth, 10s. 6d.

MR. SHAW, M.R.C.S.

THE MEDICAL REMEMBRANCER; OR, BOOK OF EMERGENCIES. Fifth Edition. Edited, with Additions, by JONATHAN HUTCHINSON, F.R.C.S. 32mo. cloth, 2s. 6d.

DR. SHEA, M.D., B.A.

A MANUAL OF ANIMAL PHYSIOLOGY. With an Appendix of Questions for the B.A. London and other Examinations. With Engravings. Foolscap 8vo. cloth, 5s. 6d.

DR. SHRIMPTON.

CHOLERA: ITS SEAT, NATURE, AND TREATMENT. With Engravings. 8vo. cloth, 4s. 6d.

MR. U. J. KAY-SHUTTLEWORTH.

FIRST PRINCIPLES OF MODERN CHEMISTRY: a Manual of Inorganic Chemistry. Crown 8vo. cloth, 4s. 6d.

DR. SIBSON, F.R.S.
MEDICAL ANATOMY. With coloured Plates. Imperial folio. Complete in Seven Fasciculi. 5s. each.

DR. E. H. SIEVEKING.
ON EPILEPSY AND EPILEPTIFORM SEIZURES: their Causes, Pathology, and Treatment. Second Edition. Post 8vo. cloth, 10s. 6d.

DR. SIMMS.
A WINTER IN PARIS: being a few Experiences and Observations of French Medical and Sanitary Matters. Fcap. 8vo. cloth, 4s.

MR. SINCLAIR AND DR. JOHNSTON.
PRACTICAL MIDWIFERY: Comprising an Account of 13,748 Deliveries, which occurred in the Dublin Lying-in Hospital, during a period of Seven Years. 8vo. cloth, 10s.

DR. SIORDET, M.B.LOND., M.R.C.P.
MENTONE IN ITS MEDICAL ASPECT. Foolsap 8vo. cloth, 2s. 6d.

MR. ALFRED SMEE, F.R.S.
GENERAL DEBILITY AND DEFECTIVE NUTRITION; their Causes, Consequences, and Treatment. Second Edition. Fcap. 8vo. cloth, 3s. 6d.

DR. SMELLIE.
OBSTETRIC PLATES: being a Selection from the more Important and Practical Illustrations contained in the Original Work. With Anatomical and Practical Directions. 8vo. cloth, 5s.

MR. HENRY SMITH, F.R.C.S.
 I.
ON STRICTURE OF THE URETHRA. 8vo. cloth, 7s. 6d.

II.
HÆMORRHOIDS AND PROLAPSUS OF THE RECTUM: Their Pathology and Treatment, with especial reference to the use of Nitric Acid. Third Edition. Fcap. 8vo. cloth, 3s.

III.
THE SURGERY OF THE RECTUM. Lettsomian Lectures. Second Edition. Fcap. 8vo. 3s. 6d.

DR. J. SMITH, M.D., F.R.C.S. EDIN.
HANDBOOK OF DENTAL ANATOMY AND SURGERY, FOR THE USE OF STUDENTS AND PRACTITIONERS. Fcap. 3vo. cloth, 3s. 6d.

DR. W. TYLER SMITH.
A MANUAL OF OBSTETRICS, THEORETICAL AND PRACTICAL. Illustrated with 186 Engravings. Fcap. 8vo. cloth, 12s. 6d.

DR. SNOW.
ON CHLOROFORM AND OTHER ANÆSTHETICS: THEIR ACTION AND ADMINISTRATION. Edited, with a Memoir of the Author, by Benjamin W. Richardson, M.D. 8vo. cloth, 10s. 6d.

MR. J. VOSE SOLOMON, F.R.C.S.
TENSION OF THE EYEBALL; GLAUCOMA: some Account of the Operations practised in the 19th Century. 8vo. cloth, 4s.

DR. STANHOPE TEMPLEMAN SPEER.

PATHOLOGICAL CHEMISTRY, IN ITS APPLICATION TO THE PRACTICE OF MEDICINE. Translated from the French of MM. BECQUEREL and RODIER. 8vo. cloth, reduced to 8s.

MR. J. K. SPENDER, M.D.LOND.

A MANUAL OF THE PATHOLOGY AND TREATMENT OF ULCERS AND CUTANEOUS DISEASES OF THE LOWER LIMBS. 8vo. cloth, 4s.

MR. BALMANNO SQUIRE, M.B.LOND.

CLINICAL LECTURES ON SKIN DISEASES. Illustrated by Coloured Photographs from Life. Complete in 36 Numbers, price 1s. 6d. each. Nos. I.—XXX. are now ready.

A MANUAL OF THE DISEASES OF THE SKIN. Illustrated by Coloured Plates of the Diseases, and by Woodcuts of the Parasites of the Skin. Post 8vo. cloth, 24s.

MR. PETER SQUIRE.

A COMPANION TO THE BRITISH PHARMACOPŒIA. Seventh Edition. 8vo. cloth, 10s. 6d.

THE PHARMACOPŒIAS OF THE LONDON HOSPITALS, arranged in Groups for easy Reference and Comparison. Second Edition. 18mo. cloth, 5s.

DR. STEGGALL.

A MEDICAL MANUAL FOR APOTHECARIES' HALL AND OTHER MEDICAL BOARDS. Twelfth Edition. 12mo. cloth, 10s.

A MANUAL FOR THE COLLEGE OF SURGEONS; intended for the Use of Candidates for Examination and Practitioners. Second Edition. 12mo. cloth, 10s.

FIRST LINES FOR CHEMISTS AND DRUGGISTS PREPARING FOR EXAMINATION AT THE PHARMACEUTICAL SOCIETY. Third Edition. 18mo. cloth, 3s. 6d.

MR. STOWE, M.R.C.S.

A TOXICOLOGICAL CHART, exhibiting at one view the Symptoms, Treatment, and Mode of Detecting the various Poisons, Mineral, Vegetable, and Animal. To which are added, concise Directions for the Treatment of Suspended Animation. Twelfth Edition, revised. On Sheet, 2s.; mounted on Roller, 5s.

MR. FRANCIS SUTTON, F.C.S.

A SYSTEMATIC HANDBOOK OF VOLUMETRIC ANALYSIS; or, the Quantitative Estimation of Chemical Substances by Measure. With Engravings. Post 8vo. cloth, 7s. 6d.

DR. SWAYNE.

OBSTETRIC APHORISMS FOR THE USE OF STUDENTS COMMENCING MIDWIFERY PRACTICE. With Engravings on Wood. Fourth Edition. Fcap. 8vo. cloth, 3s. 6d.

MR. TAMPLIN, F.R.C.S.E.

LATERAL CURVATURE OF THE SPINE: its Causes, Nature, and Treatment. 8vo. cloth, 4s.

SIR ALEXANDER TAYLOR, M.D., F.R.S.E.

THE CLIMATE OF PAU; with a Description of the Watering Places of the Pyrenees, and of the Virtues of their respective Mineral Sources in Disease. Third Edition. Post 8vo. cloth, 7s.

DR. ALFRED S. TAYLOR, F.R.S.

I.
THE PRINCIPLES AND PRACTICE OF MEDICAL JURISPRUDENCE. With 176 Wood Engravings. 8vo. cloth, 28s.

II.
A MANUAL OF MEDICAL JURISPRUDENCE. Eighth Edition. With Engravings. Fcap. 8vo. cloth, 12s. 6d.

III.
ON POISONS, in relation to MEDICAL JURISPRUDENCE AND MEDICINE. Second Edition. Fcap. 8vo. cloth, 12s. 6d.

MR. TEALE.

ON AMPUTATION BY A LONG AND A SHORT RECTANGULAR FLAP. With Engravings on Wood. 8vo. cloth, 5s.

DR. THEOPHILUS THOMPSON, F.R.S.

CLINICAL LECTURES ON PULMONARY CONSUMPTION; with additional Chapters by E. SYMES THOMPSON, M.D. With Plates. 8vo. cloth, 7s. 6d.

DR. THOMAS.

THE MODERN PRACTICE OF PHYSIC; exhibiting the Symptoms, Causes, Morbid Appearances, and Treatment of the Diseases of all Climates. Eleventh Edition. Revised by ALGERNON FRAMPTON, M.D. 2 vols. 8vo. cloth, 28s.

SIR HENRY THOMPSON, F.R.C.S.

I.
STRICTURE OF THE URETHRA; its Pathology and Treatment. The Jacksonian Prize Essay for 1852. With Plates. Second Edition. 8vo. cloth, 10s.

II.
THE DISEASES OF THE PROSTATE; their Pathology and Treatment. With Plates. Third Edition. 8vo. cloth, 10s.

III.
PRACTICAL LITHOTOMY AND LITHOTRITY; or, An Inquiry into the best Modes of removing Stone from the Bladder. With numerous Engravings. 8vo. cloth, 9s.

IV.
CLINICAL LECTURES ON DISEASES OF THE URINARY ORGANS. With Engravings. Crown 8vo. cloth, 5s.

DR. THUDICHUM.

I.
A TREATISE ON THE PATHOLOGY OF THE URINE, Including a complete Guide to its Analysis. With Plates, 8vo. cloth, 14s.

II.
A TREATISE ON GALL STONES: their Chemistry, Pathology, and Treatment. With Coloured Plates. 8vo. cloth, 10s.

DR. TILT.

I.
ON UTERINE AND OVARIAN INFLAMMATION, AND ON
THE PHYSIOLOGY AND DISEASES OF MENSTRUATION. Third Edition.
8vo. cloth, 12s.

II.
A HANDBOOK OF UTERINE THERAPEUTICS AND OF
DISEASES OF WOMEN. Third Edition. Post 8vo. cloth, 10s.

III.
THE CHANGE OF LIFE IN HEALTH AND DISEASE: a
Practical Treatise on the Nervous and other Affections incidental to Women at the Decline
of Life. Second Edition. 8vo. cloth, 6s.

DR. GODWIN TIMMS.

CONSUMPTION: its True Nature and Successful Treatment. Re-issue,
enlarged. Crown 8vo. cloth, 10s.

DR. ROBERT B. TODD, F.R.S.

I.
CLINICAL LECTURES ON THE PRACTICE OF MEDICINE.
New Edition, in one Volume, Edited by DR. BEALE, 8vo. cloth, 18s.

II.
ON CERTAIN DISEASES OF THE URINARY ORGANS, AND
ON DROPSIES. Fcap. 8vo. cloth, 6s.

MR. TOMES, F.R.S.

A MANUAL OF DENTAL SURGERY. With 208 Engravings on
Wood. Fcap. 8vo. cloth, 12s. 6d.

DR. TURNBULL.

I.
AN INQUIRY INTO THE CURABILITY OF CONSUMPTION,
ITS PREVENTION, AND THE PROGRESS OF IMPROVEMENT IN THE
TREATMENT. Third Edition. 8vo. cloth, 6s.

II.
A PRACTICAL TREATISE ON DISORDERS OF THE STOMACH
with FERMENTATION; and on the Causes and Treatment of Indigestion, &c. 8vo.
cloth, 6s.

DR. TWEEDIE, F.R.S.

CONTINUED FEVERS: THEIR DISTINCTIVE CHARACTERS,
PATHOLOGY, AND TREATMENT. With Coloured Plates. 8vo. cloth, 12s.

VESTIGES OF THE NATURAL HISTORY OF CREATION.
Eleventh Edition. Illustrated with 106 Engravings on Wood. 8vo. cloth, 7s. 6d.

DR. UNDERWOOD.

TREATISE ON THE DISEASES OF CHILDREN. Tenth Edition,
with Additions and Corrections by HENRY DAVIES, M.D. 8vo. cloth, 15s.

MR. WADE, F.R.C.S.

STRICTURE OF THE URETHRA, ITS COMPLICATIONS AND EFFECTS; a Practical Treatise on the Nature and Treatment of those Affections. Fourth Edition. 8vo. cloth, 7s. 6d.

DR. WAHLTUCH, M.D.

A DICTIONARY OF MATERIA MEDICA AND THERAPEUTICS. 8vo. cloth, 15s.

DR. WALKER, M.B.LOND.

ON DIPHTHERIA AND DIPHTHERITIC DISEASES. Fcap. 8vo. cloth, 3s.

DR. WALLER.

ELEMENTS OF PRACTICAL MIDWIFERY; or, Companion to the Lying-in Room. Fourth Edition, with Plates. Fcap. cloth, 4s. 6d.

MR. HAYNES WALTON, F.R.C.S.

SURGICAL DISEASES OF THE EYE. With Engravings on Wood. Second Edition. 8vo. cloth, 14s.

DR. WARING, M.D., M.R.C.P.LOND.

A MANUAL OF PRACTICAL THERAPEUTICS. Second Edition, Revised and Enlarged. Fcap. 8vo. cloth, 12s. 6d.**THE TROPICAL RESIDENT AT HOME.** Letters addressed to Europeans returning from India and the Colonies on Subjects connected with their Health and General Welfare. Crown 8vo. cloth, 5s.

DR. WATERS, F.R.C.P.

DISEASES OF THE CHEST. CONTRIBUTIONS TO THEIR CLINICAL HISTORY, PATHOLOGY, AND TREATMENT. With Plates. 8vo. cloth, 12s. 6d.**THE ANATOMY OF THE HUMAN LUNG.** The Prize Essay to which the Fothergillian Gold Medal was awarded by the Medical Society of London. Post 8vo. cloth, 6s. 6d.**RESEARCHES ON THE NATURE, PATHOLOGY, AND TREATMENT OF EMPHYSEMA OF THE LUNGS, AND ITS RELATIONS WITH OTHER DISEASES OF THE CHEST.** With Engravings. 8vo. cloth, 5s.

DR. ALLAN WEBB, F.R.C.S.L.

THE SURGEON'S READY RULES FOR OPERATIONS IN SURGERY. Royal 8vo. cloth, 10s. 6d.

MR. SOELBERG WELLS.

I.
A TREATISE ON THE DISEASES OF THE EYE. With
Coloured Plates and Wood Engravings. 8vo. cloth, 24s.

II.
ON LONG, SHORT, AND WEAK SIGHT, and their Treatment by
the Scientific Use of Spectacles. Third Edition. With Plates. 8vo. cloth, 6s.

MR. T. SPENCER WELLS, F.R.C.S.

I.
DISEASES OF THE OVARIES: THEIR DIAGNOSIS AND
TREATMENT. Vol. I. 8vo. cloth, 9s.

II.
SCALE OF MEDICINES FOR MERCHANT VESSELS.
With Observations on the Means of Preserving the Health of Seamen, &c. &c.
Seventh Thousand. Fcap. 8vo. cloth, 3s. 6d.

DR. WEST.

LECTURES ON THE DISEASES OF WOMEN. Third Edition.
8vo. cloth, 16s.

DR. UVEDALE WEST.

ILLUSTRATIONS OF PUERPERAL DISEASES. Second Edition, enlarged. Post 8vo. cloth, 5s.

MR. WHEELER.

HAND-BOOK OF ANATOMY FOR STUDENTS OF THE
FINE ARTS. With Engravings on Wood. Fcap. 8vo., 2s. 6d.

DR. WHITEHEAD, F.R.C.S.

ON THE TRANSMISSION FROM PARENT TO OFFSPRING
OF SOME FORMS OF DISEASE, AND OF MORBID TAINTS AND
TENDENCIES. Second Edition. 8vo. cloth, 10s. 6d.

DR. WILLIAMS, F.R.S.

PRINCIPLES OF MEDICINE: An Elementary View of the Causes,
Nature, Treatment, Diagnosis, and Prognosis, of Disease. With brief Remarks on
Hygienics, or the Preservation of Health. The Third Edition. 8vo. cloth, 15s.

DR. CHARLES T. WILLIAMS, M.B. OXON.

THE CLIMATE OF THE SOUTH OF FRANCE, AND ITS
VARIETIES, MOST SUITABLE FOR INVALIDS; with Remarks on Italian
and other Winter Stations. Crown 8vo. cloth, 3s. 6d.

DR. WINSLOW, M.D., D.C. LOXON.

OBSCURE DISEASES OF THE BRAIN AND MIND.
Fourth Edition. Carefully Revised. Post 8vo. cloth, 10s. 6d.

DR. WISE, M.D., F.R.C.P. EDIN.

REVIEW OF THE HISTORY OF MEDICINE AMONG
ASIATIC NATIONS. Two Vols. 8vo. cloth, 16s.

MR. ERASMUS WILSON, F.R.S.

I.
THE ANATOMIST'S VADE-MECUM: A SYSTEM OF HUMAN ANATOMY. With numerous Illustrations on Wood. Eighth Edition. Foolscep 8vo. cloth, 12s. 6d.

II.
ON DISEASES OF THE SKIN: A SYSTEM OF CUTANEOUS MEDICINE. Sixth Edition. 8vo. cloth, 18s.

THE SAME WORK; illustrated with finely executed Engravings on Steel, accurately coloured. 8vo. cloth, 36s.

III.
HEALTHY SKIN: A Treatise on the Management of the Skin and Hair in relation to Health. Seventh Edition. Foolscep 8vo. 2s. 6d.

IV.
PORTRAITS OF DISEASES OF THE SKIN. Folio. Fasciculi I. to XII., completing the Work. 20s. each. The Entire Work, half morocco, £13.

V.
THE STUDENT'S BOOK OF CUTANEOUS MEDICINE AND DISEASES OF THE SKIN. Post 8vo. cloth, 8s. 6d.

VI.
ON SYPHILIS, CONSTITUTIONAL AND HEREDITARY; AND ON SYPHILITIC ERUPTIONS. With Four Coloured Plates. 8vo. cloth, 16s.

VII.
A THREE WEEKS' SCAMPER THROUGH THE SPAS OF GERMANY AND BELGIUM, with an Appendix on the Nature and Uses of Mineral Waters. Post 8vo. cloth, 6s. 6d.

VIII.
THE EASTERN OR TURKISH BATH: its History, Revival in Britain, and Application to the Purposes of Health. Foolscep 8vo., 2s.

DR. G. C. WITTSTEIN.

PRACTICAL PHARMACEUTICAL CHEMISTRY: An Explanation of Chemical and Pharmaceutical Processes, with the Methods of Testing the Purity of the Preparations, deduced from Original Experiments. Translated from the Second German Edition, by STEPHEN DARBY. 18mo. cloth, 6s.

DR. WOLFE, M.D.

AN IMPROVED METHOD OF EXTRACTION OF CATARACT.

With Results of 107 Operations. 8vo. cloth, 2s. 6d.

DR. HENRY G. WRIGHT.

I.
UTERINE DISORDERS: their Constitutional Influence and Treatment. 8vo. cloth, 7s. 6d.

II.
HEADACHES; their Causes and their Cure. Fourth Edition. Fcap. 8vo. 2s. 6d.

DR. YEARSLEY, M.D., M.R.C.S.

I.
DEAFNESS PRACTICALLY ILLUSTRATED; being an Exposition as to the Causes and Treatment of Diseases of the Ear. Sixth Edition. 8vo. cloth, 6s.

II.
ON THROAT AILMENTS, MORE ESPECIALLY IN THE ENLARGED TONSIL AND ELONGATED UVULA. Eighth Edition. 8vo. cloth, 5s.

CHURCHILL'S SERIES OF MANUALS.

Fcap. 8vo. cloth, 12s. 6d. each.

"We here give Mr. Churchill public thanks for the positive benefit conferred on the Medical Profession, by the series of beautiful and cheap Manuals which bear his imprint."—*British and Foreign Medical Review.*

AGGREGATE SALE, 154,000 COPIES.

- ANATOMY.** With numerous Engravings. Eighth Edition. By ERASMUS WILSON, F.R.C.S., F.R.S.
- BOTANY.** With numerous Engravings. By ROBERT BENTLEY, F.L.S., Professor of Botany, King's College, and to the Pharmaceutical Society.
- CHEMISTRY.** With numerous Engravings. Tenth Edition, 14s. By GEORGE FOWNES, F.R.S., H. BENCE JONES, M.D., F.R.S., and HENRY WATTS, B.A., F.R.S.
- DENTAL SURGERY.** With numerous Engravings. By JOHN TOMES, F.R.S.
- EYE, DISEASES OF.** With coloured Plates and Engravings on Wood. By C. MACNAMARA.
- MATERIA MEDICA.** With numerous Engravings. Fifth Edition. By J. FORBES ROYLE, M.D., F.R.S., and F. W. HEADLAND, M.D., F.L.S.
- MEDICAL JURISPRUDENCE.** With numerous Engravings. Eighth Edition. By ALFRED SWAINE TAYLOR, M.D., F.R.S.
- PRACTICE OF MEDICINE.** Second Edition. By G. HILARO BARLOW, M.D., M.A.
- The MICROSCOPE and its REVELATIONS.** With numerous Plates and Engravings. Fourth Edition. By W. B. CARPENTER, M.D., F.R.S.
- NATURAL PHILOSOPHY.** With numerous Engravings. Sixth Edition. By CHARLES BROOKE, M.B., M.A., F.R.S. *Based on the Work of the late Dr. Golding Bird.*
- OBSTETRICS.** With numerous Engravings. By W. TYLER SMITH, M.D., F.R.C.P.
- OPHTHALMIC MEDICINE and SURGERY.** With coloured Plates and Engravings on Wood. Third Edition. By T. WHARTON JONES, F.R.C.S., F.R.S.
- PATHOLOGICAL ANATOMY.** With numerous Engravings. By C. HANDFIELD JONES, M.B., F.R.S., and E. H. SIEVEKING, M.D., F.R.C.P.
- PHYSIOLOGY.** With numerous Engravings. Fourth Edition. By WILLIAM B. CARPENTER, M.D., F.R.S.
- POISONS.** Second Edition. By ALFRED SWAINE TAYLOR, M.D., F.R.S.
- PRACTICAL ANATOMY.** With numerous Engravings. (10s. 6d.) By CHRISTOPHER HEATH, F.R.C.S.
- PRACTICAL SURGERY.** With numerous Engravings. Fourth Edition. By Sir WILLIAM FERGUSSON, Bart., F.R.C.S., F.R.S.
- THERAPEUTICS.** Second Edition. By E. J. Waring, M.D., M.R.C.P.



